

AIR CONDITIONING SYSTEM (for Automatic Air Conditioning System)

PRECAUTION

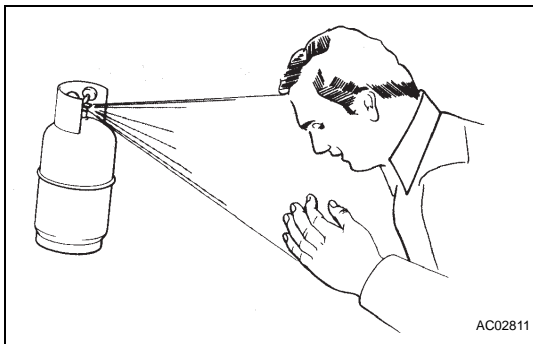
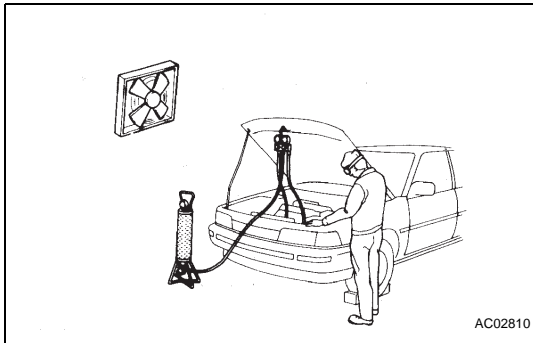
1. IF ANY OF FOLLOWING CONDITIONS ARE MET, KEEP ENGINE IDLING WITH A/C ON (ENGINE SPEED AT LESS THAN 2000 RPM) FOR AT LEAST 1 MINUTE:

- Refrigerant gas has been refilled or A/C parts have been replaced.
- A long time has elapsed since the engine was stopped.

NOTICE:

If the engine speed exceeds 2,000 rpm, the A/C compressor may be damaged.

2. DO NOT HANDLE REFRIGERANT IN ENCLOSED AREAS OR NEAR OPEN FLAMES
3. ALWAYS WEAR EYE PROTECTION



4. BE CAREFUL NOT TO GET LIQUID REFRIGERANT IN YOUR EYES OR ON YOUR SKIN

If liquid refrigerant gets in your eyes or on your skin:

- (a) Wash the area with lots of cold water.

CAUTION:

Do not rub your eyes or skin.

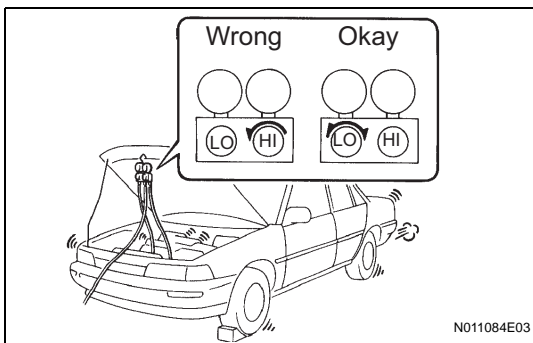
- (b) Apply clean petroleum jelly to the skin.
- (c) Go immediately to a physician or hospital for professional treatment.

5. NEVER HEAT CONTAINER OR EXPOSE IT TO OPEN FLAME

6. BE CAREFUL NOT TO DROP CONTAINER OR SUBJECT IT TO PHYSICAL SHOCKS

7. DO NOT OPERATE COMPRESSOR WITH INSUFFICIENT REFRIGERANT IN REFRIGERANT SYSTEM

If there is not enough refrigerant in the refrigerant system, oil lubrication will be insufficient and compressor burnout may occur. Necessary care should be taken to avoid this.



8. DO NOT OPEN HIGH PRESSURE MANIFOLD VALVE WHILE COMPRESSOR IS OPERATING

Open and close only the low pressure valve. Opening and closing the high pressure valve could cause the charging cylinder to rupture.

9. BE CAREFUL NOT TO OVERCHARGE SYSTEM WITH REFRIGERANT

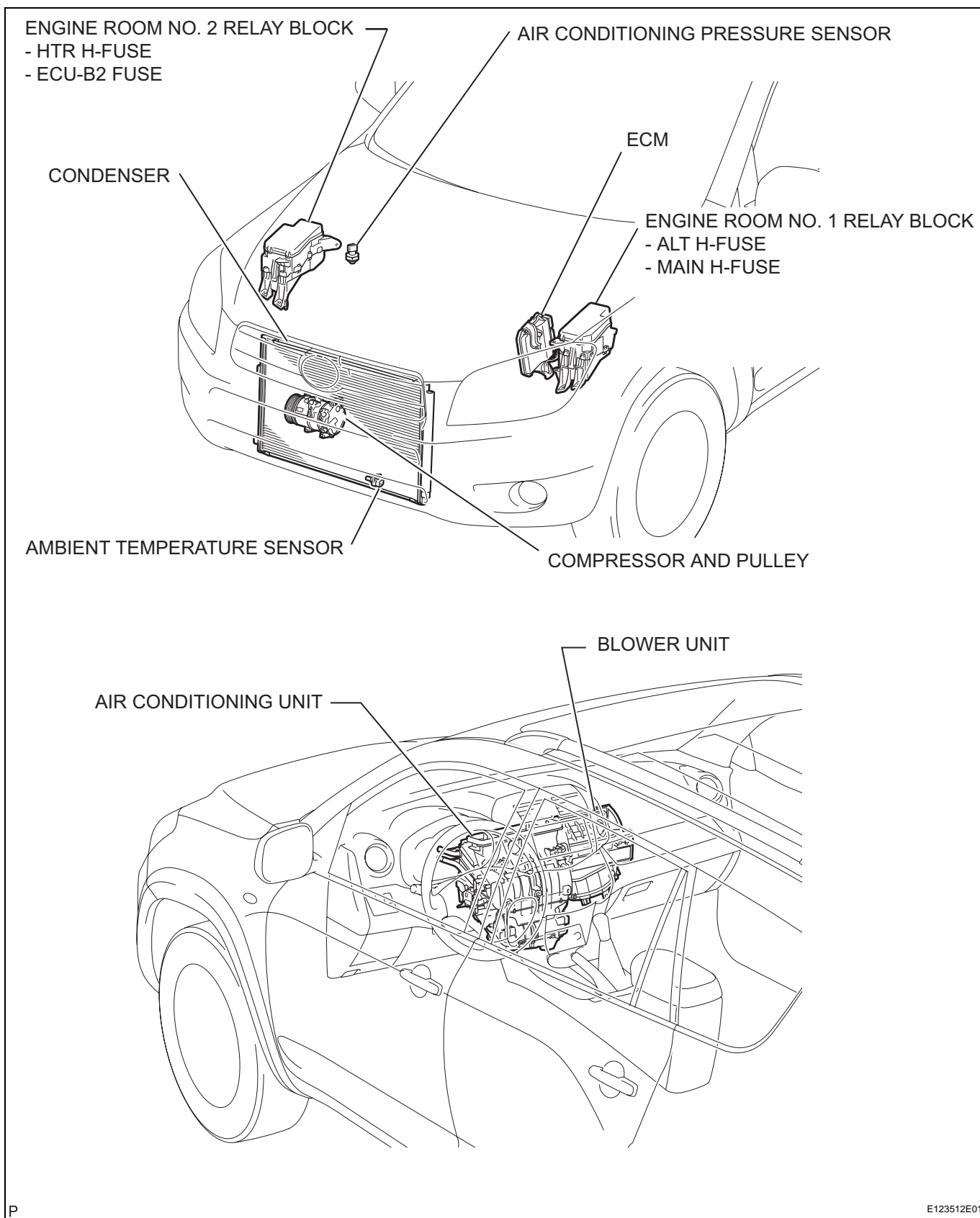
If the refrigerant is overcharged, it causes problems such as insufficient cooling, poor fuel economy and engine overheating.

10. DO NOT OPERATE ENGINE AND COMPRESSOR WITHOUT REFRIGERANT**NOTICE:**

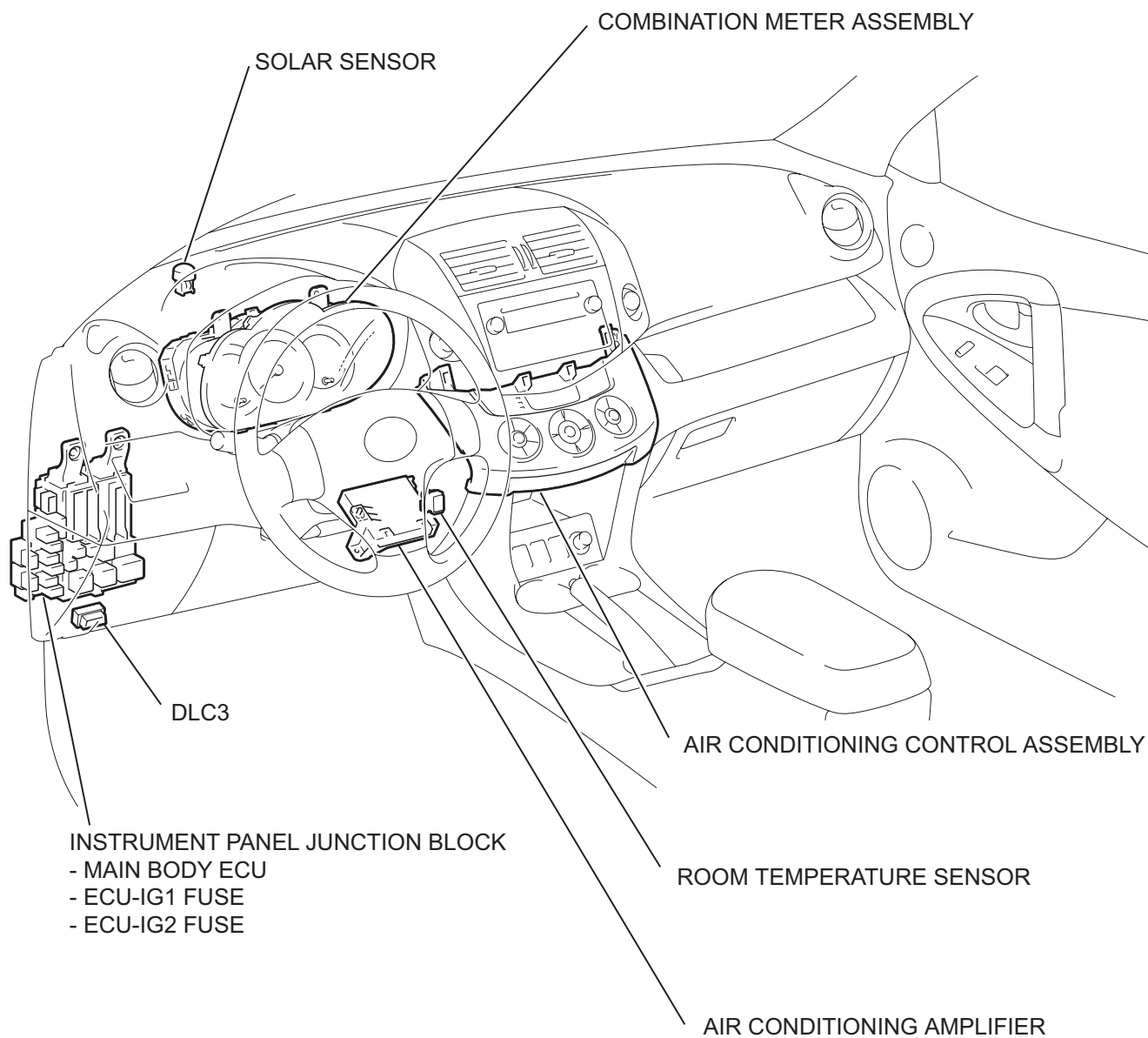
This may damage the inside of the compressor.

PARTS LOCATION

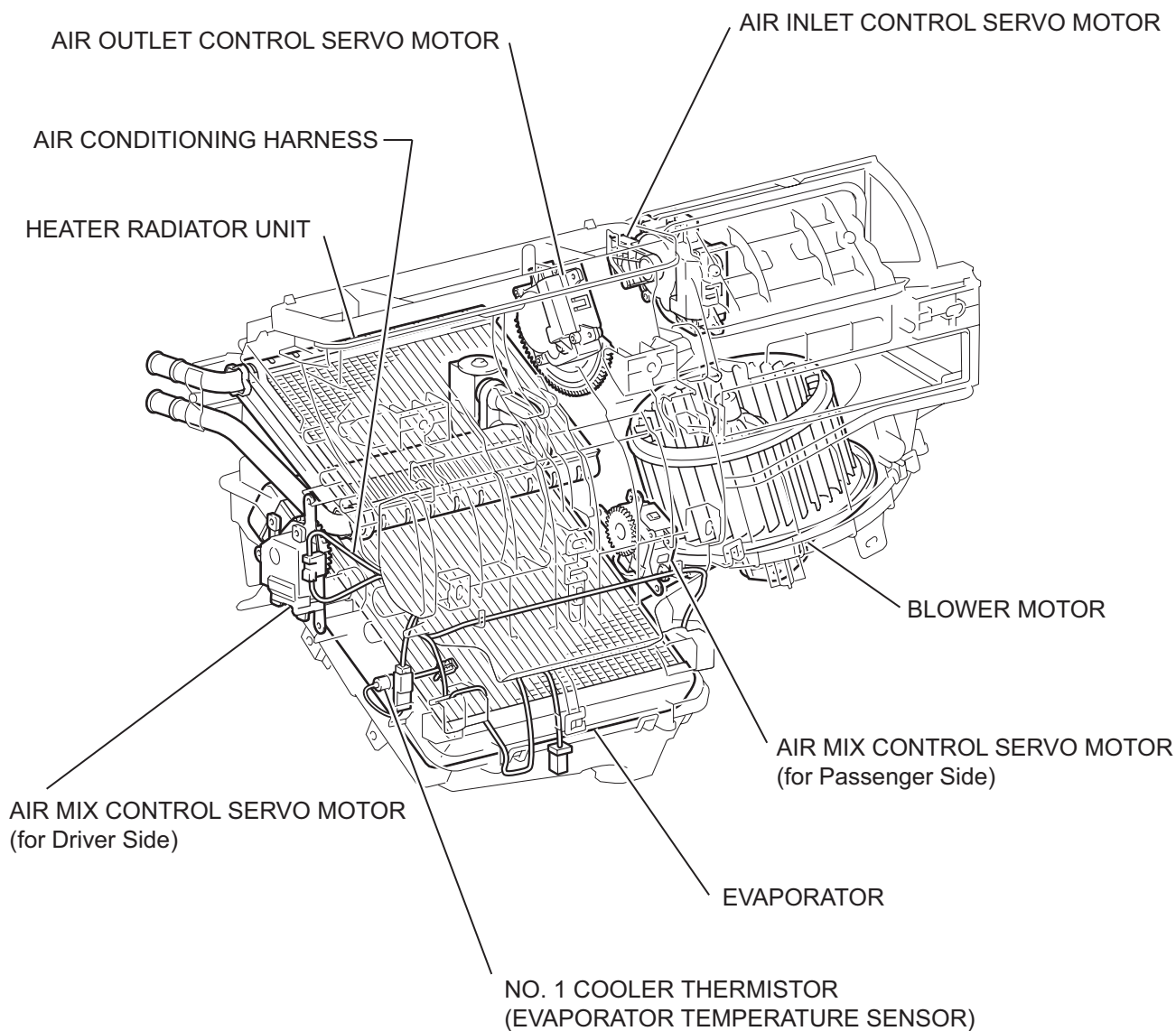
(2005/11-2006/01)



AC



AC



AC

PARTS LOCATION

(2006/01-)

ENGINE ROOM NO. 2 RELAY BLOCK
- HTR H-FUSE
- ECU-B2 FUSE

AIR CONDITIONING PRESSURE SENSOR

CONDENSER

ECM

ENGINE ROOM NO. 1 RELAY BLOCK
- ALT H-FUSE
- MAIN H-FUSE

AMBIENT TEMPERATURE SENSOR

COMPRESSOR AND PULLEY*1

COMPRESSOR AND MAGNETIC CLUTCH*2

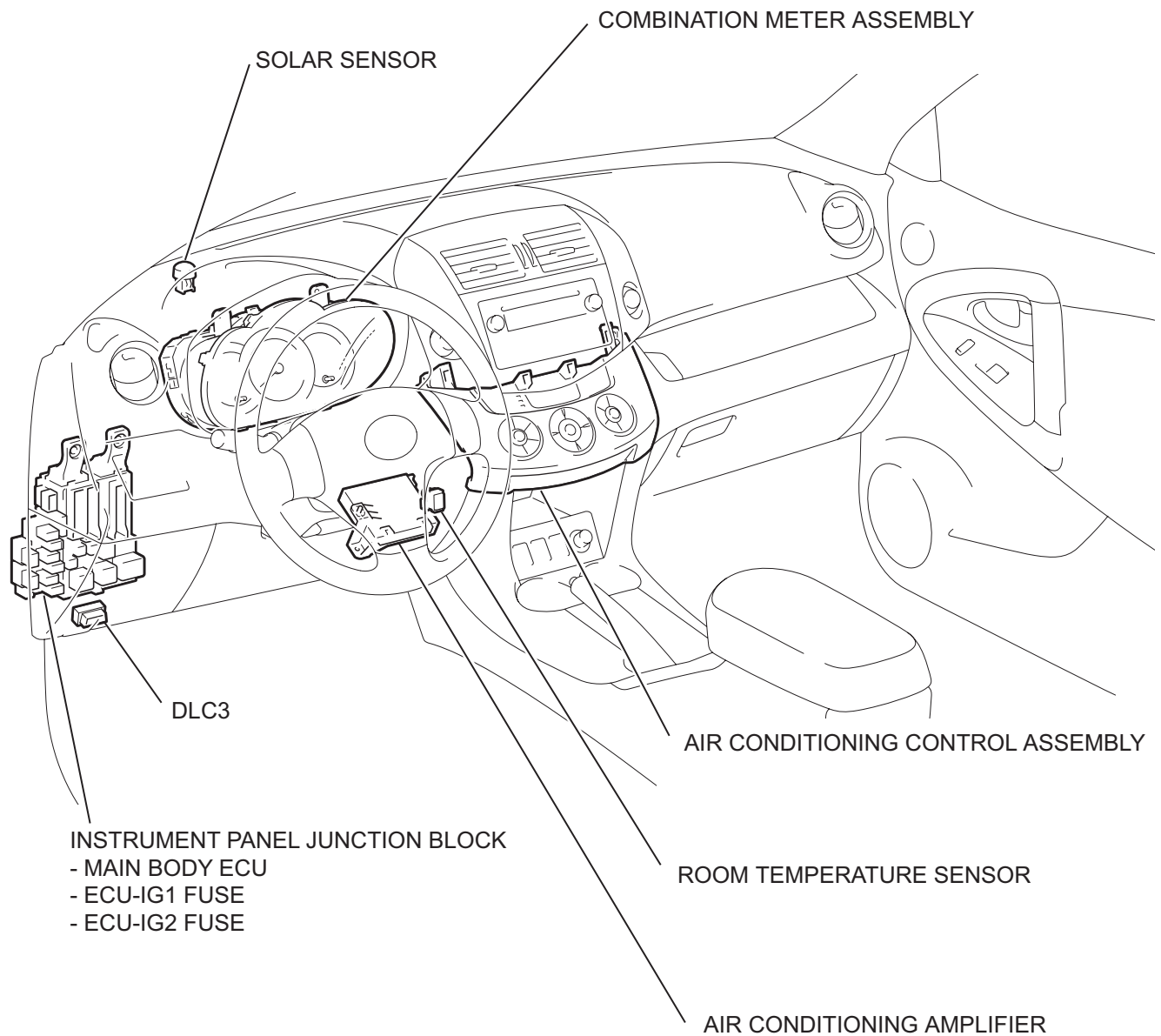
BLOWER UNIT

AIR CONDITIONING UNIT

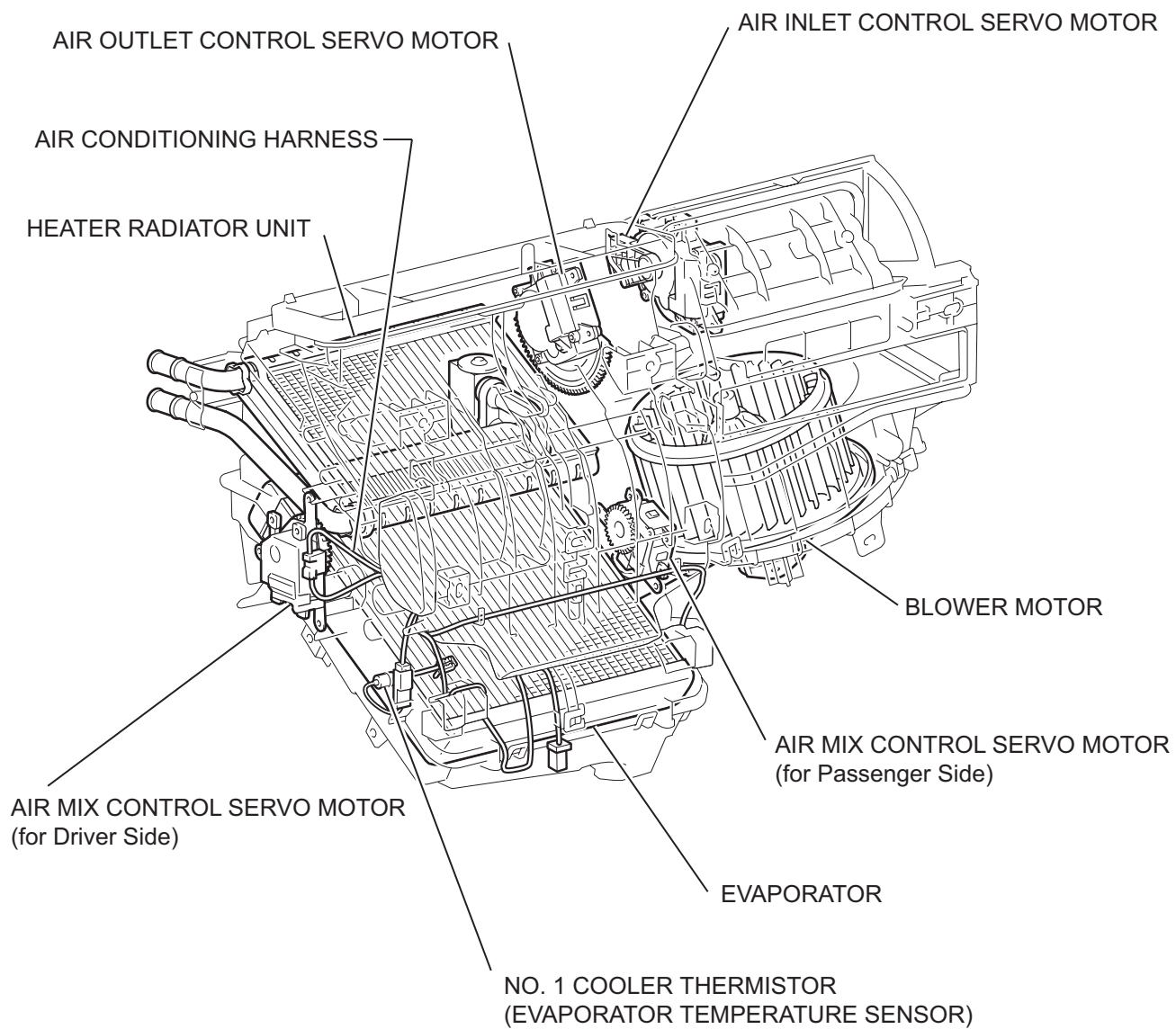
*1: for 2AZ-FE

*2: for 2GR-FE

AC



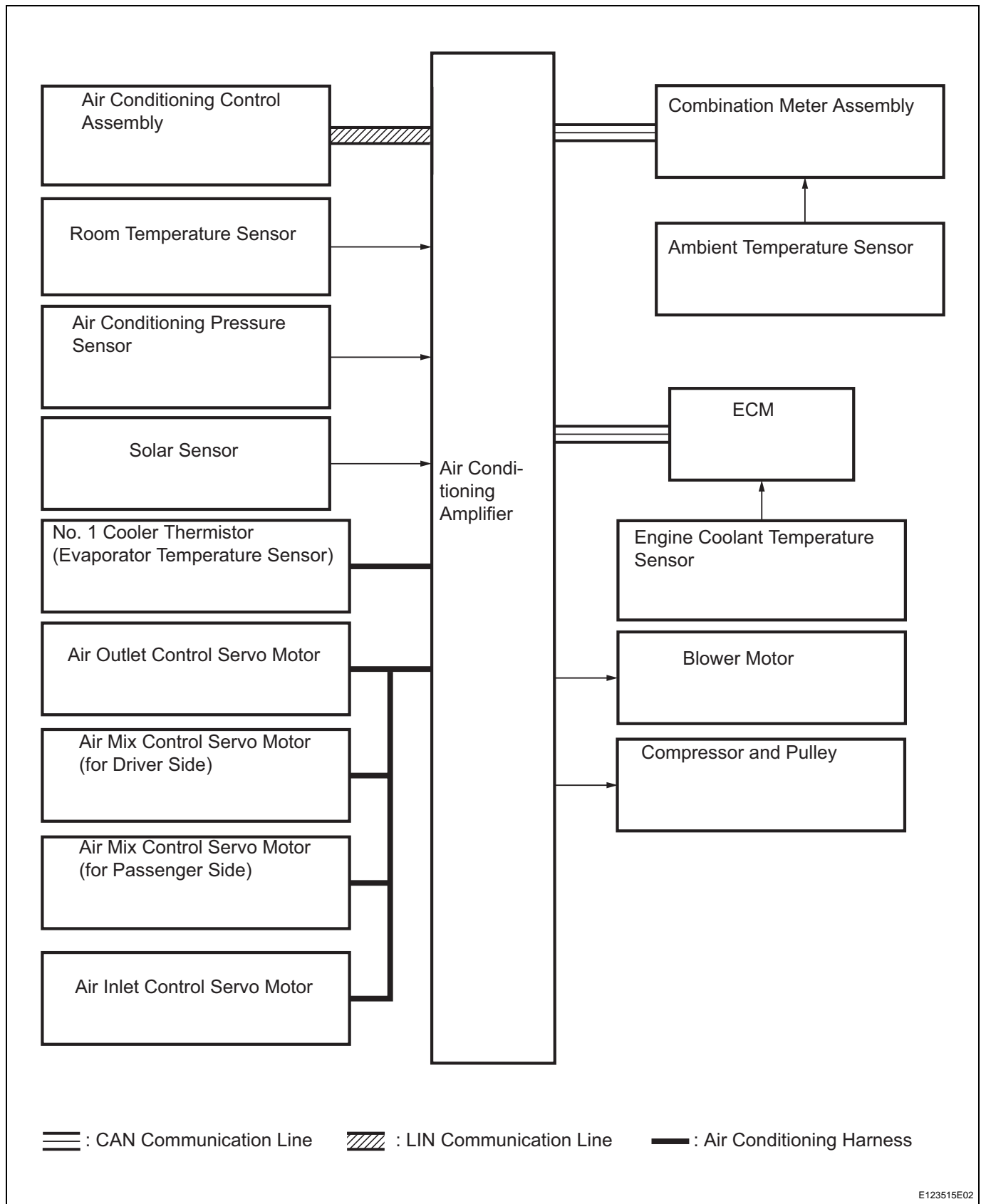
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AC

SYSTEM DIAGRAM

(2005/11-2006/01)



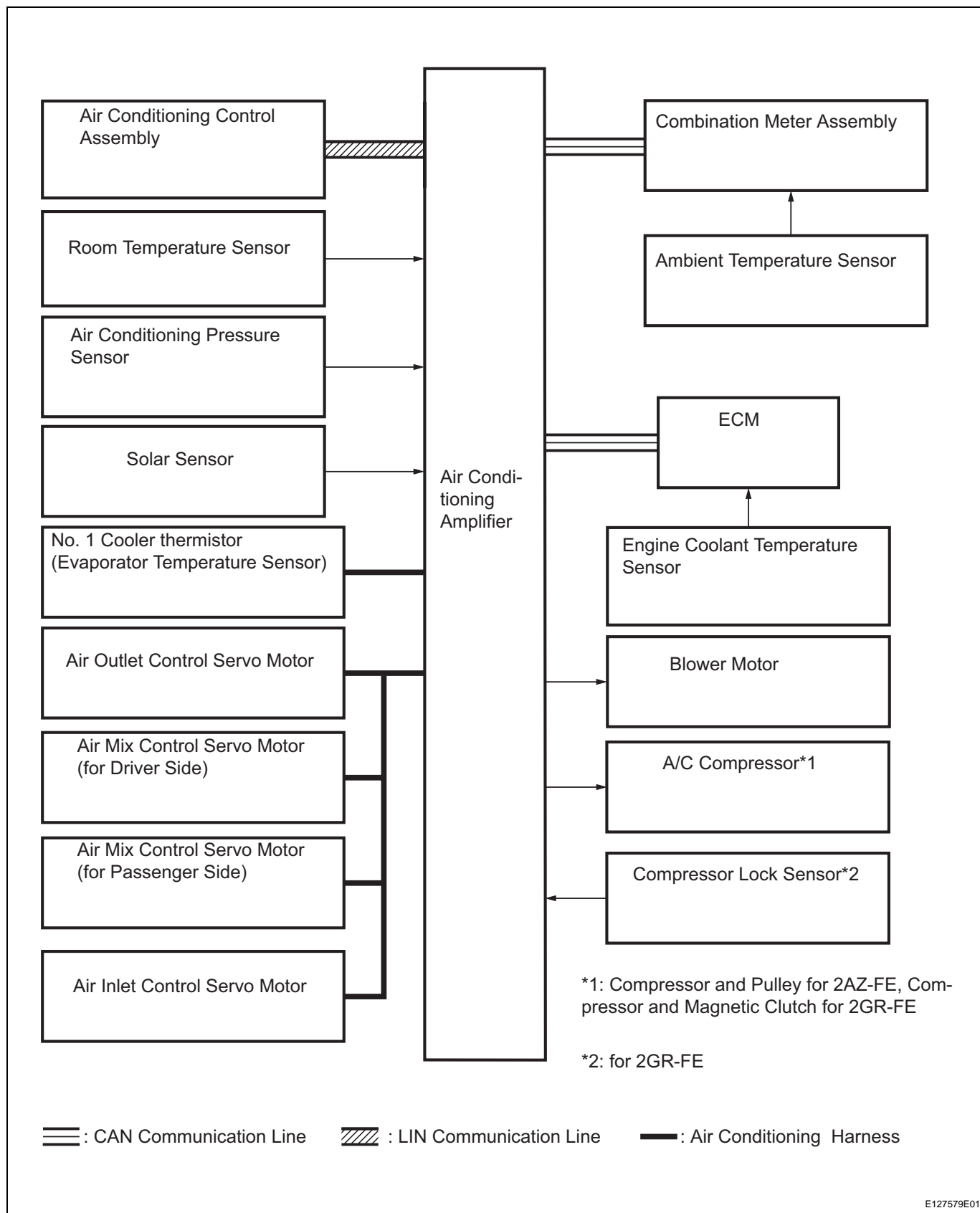
AC

Communication table

Sender	Receiver	Signal	Communication Line
Air conditioning amplifier	ECM	A/C compressor control signal	CAN
		Idle up request signal	
		External variable control solenoid current signal	
		Cooling fan motor driving request signal	
		Ambient temperature signal	
Air conditioning amplifier	Air conditioning control assembly	Front panel indication signal	LIN
		AUTO indication signal	
		A/C indication signal	
		MODE indication signal	
		REC indication signal	
		FRS indication signal	
		RDEF indication signal	
		Blower level indication signal	
		Set temperature indication signal	
Combination meter assembly	Air conditioning amplifier	Vehicle speed signal	CAN
		Ambient temperature signal	
ECM	Air conditioning amplifier	Engine revolution speed signal	CAN
		Engine coolant temperature signal	
		A/C control cut signal	
		Variable control prohibition signal	
Air conditioning control assembly	Air conditioning amplifier	AUTO switch signal	LIN
		OFF switch signal	
		A/C switch signal	
		DEF switch signal	
		MODE switch signal	
		RDEF switch signal	
		Blower switch signal (FAN+, FAN-)	
		Set temperature switch signal (UP, DOWN)	

SYSTEM DIAGRAM

(2006/01-)



AC

Communication table

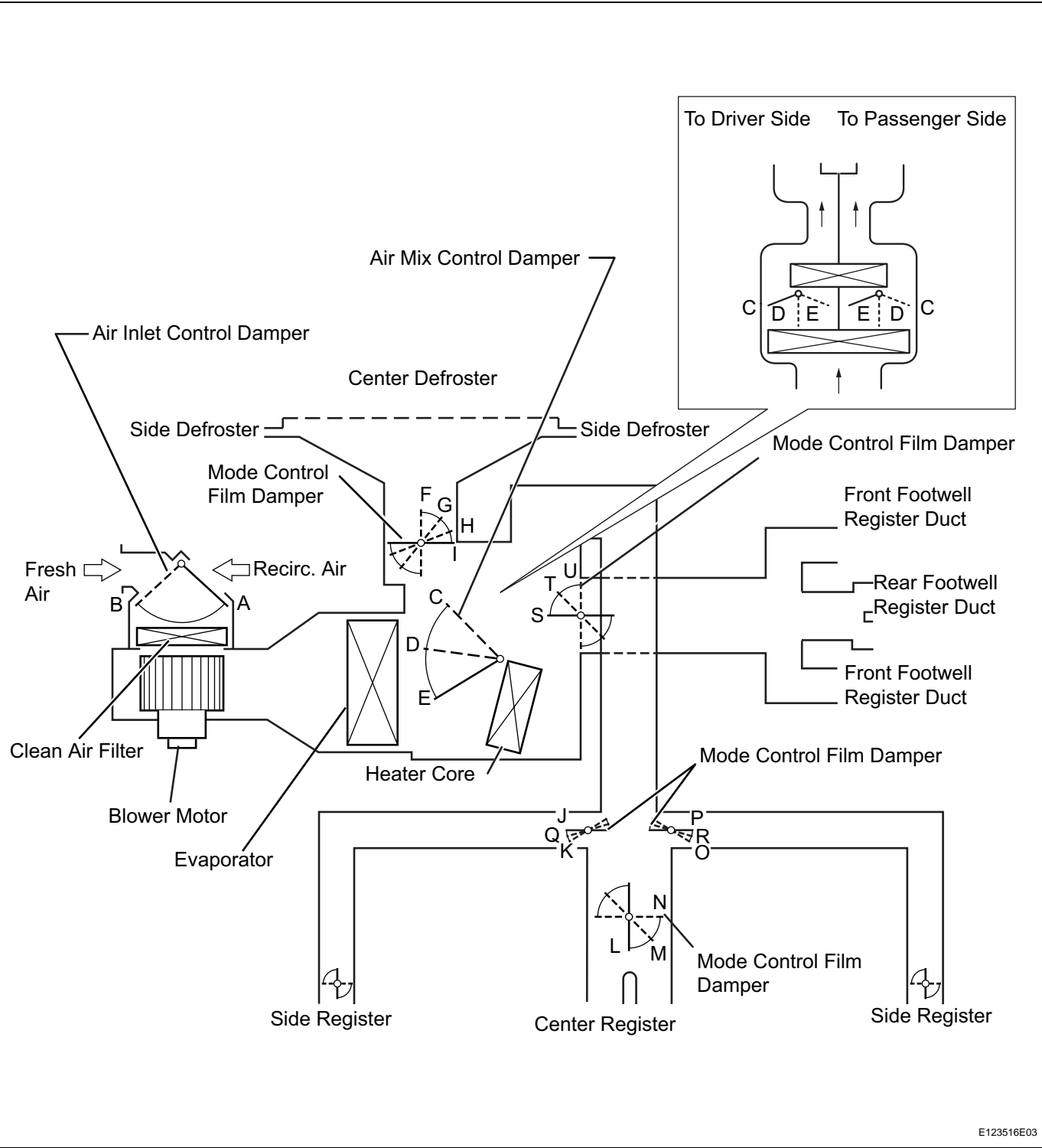
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		AUTO indication signal	
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		Set temperature indication signal	
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		Ambient temperature signal	
ECM	Air conditioning amplifier	Engine revolution speed signal	CAN
		Engine coolant temperature signal	
		A/C control cut signal	
		Variable control prohibition signal	
Air conditioning control assembly	Air conditioning amplifier	AUTO switch signal	LIN
		OFF switch signal	
		A/C switch signal	
		DEF switch signal	
		MODE switch signal	
		RDEF switch signal	
		Blower switch signal (FAN+, FAN-)	
		Set temperature switch signal (UP, DOWN)	

SYSTEM DESCRIPTION






1. GENERAL

- (a) The air conditioning system has the following features:
- In accordance with the temperature set using the temperature control switch, the air conditioning amplifier determines the outlet temperature based on the input signals from various sensors. In addition, corrections are made in accordance with the signals from the water temperature sensor to control the outlet air temperature.
 - Controls the blower motor in accordance with the airflow volume determined by the air conditioning amplifier based on the input signals from various sensors.
 - Automatically changes the outlets in accordance with the outlet mode ratio that is determined by the air conditioning amplifier based on the input signals from various sensors.
 - Based on the signals from the ambient temperature sensor, this system calculates the outside temperature and indicates it in the multi-information display in the combination meter assembly.
 - The left/right independent temperature control and neural network control make air conditioner control available to suit the persons in the driver seat and in the passenger seat.
 - Turns the rear defogger and outside rear mirror heaters on for 15 minutes when the rear defogger switch is pressed. Turns them off if the switch is pressed while they are operating.
 - Checks the sensors in accordance with the operation of the air conditioner switches.
 - The air conditioning amplifier has the function of controlling the indicator lighting.

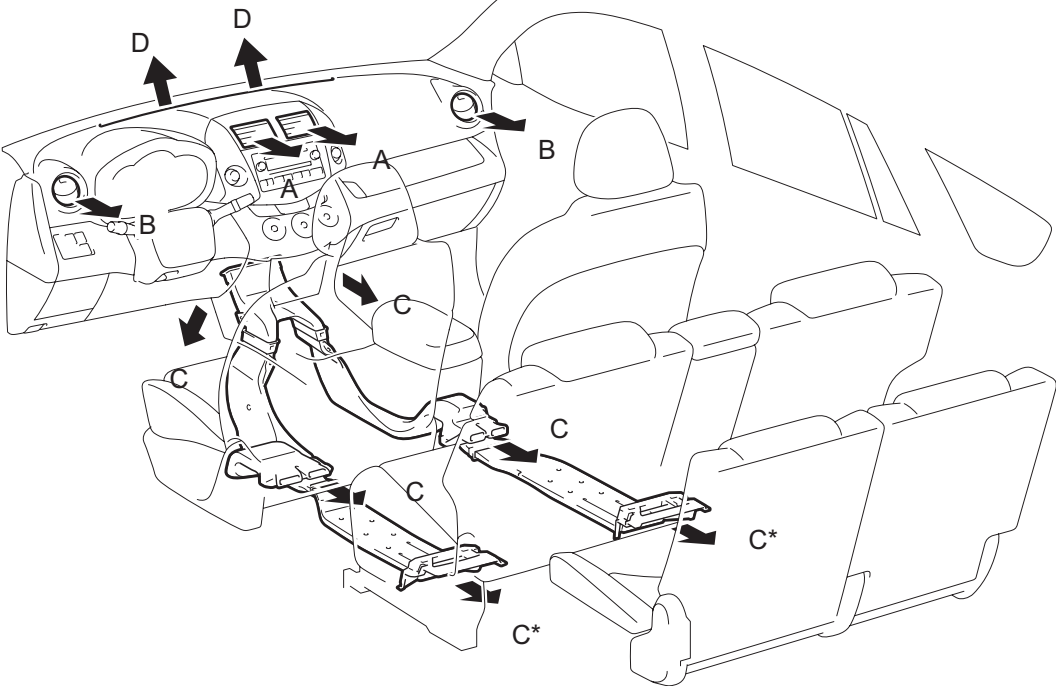
2. MODE POSITION AND DAMPER OPERATION



Control Damper		Control Position	Damper Position	Operation
Air Inlet Control Damper		FRESH	A	Brings in fresh air.
		RECIRC	B	Recirculates internal air.
Air Mix Control Damper (Left/Right Independent Control)	Driver and Front Passenger Side	MAX COOL to MAX HOT (TEMP. SETTING 18 to 32°C (65 to 85°F))	C, D, E	Varies mixture ratio of fresh air and recirculation air in order to regulate temperature continuously from HOT to COOL.

Control Damper		Control Position	Damper Position	Operation
Mode Control Film Damper	Driver and Front Passenger Side	FACE 	I, J, L, P, U	Air blows out of center registers and side registers.
		BI-LEVEL 	I, Q, M, R, T	Air mainly blows out of center registers, side registers, and footwell register ducts.
		FOOT 	H, K, N, O, S	Air mainly blows out of front and rear footwell register ducts. In addition, air blows out slightly from front and side defrosters, and side registers.
		FOOT/DEF 	G, K, N, O, T	Air mainly blows out of front and side defrosters to defrost windshield. Air also blows out from front and rear footwell register ducts, and side registers.
		DEF 	F, K, N, O, U	Air blows out of front and side defrosters and side registers to defrost windshield.






3. AIR OUTLET AND AIRFLOW VOLUME



*: w/ Rear No. 2 Seat

P

The circle size (○) indicates the proportion of the flow volume.

Air Outlet Mode		Air Outlet Position Symbol			
		A	B	C	D
		Center Face	Side Face	Foot	Defroster
	FACE	○	○	X	X
	BI-LEVEL	○	○	○	X
	FOOT	X	○	○	○
	FOOT/DEF	X	○	○	○
	DEF	X	○	X	○

HOW TO PROCEED WITH TROUBLESHOOTING

(2005/11-2006/01)

HINT:

- Use these procedures to troubleshoot the air conditioning system.
- *: Use the intelligent tester.

1 VEHICLE BROUGHT TO WORKSHOP

NEXT

2 CUSTOMER PROBLEM ANALYSIS AND SYMPTOM CHECK

NEXT

3 INSPECT BATTERY VOLTAGE

Standard voltage:**11 to 14 V**

If the voltage is below 11 V, recharge or replace the battery before proceeding.

NEXT

4 CHECK CAN COMMUNICATION SYSTEM*

AC

- (a) Use the intelligent tester to check if the CAN communication system is functioning.

Result

Result	Proceed to
CAN DTC is not output	A
CAN DTC is output	B

B

Go to CAN COMMUNICATION SYSTEM

A

5 CHECK DTC OR CHECK SENSOR CHECK CODE THROUGH PANEL DIAGNOSIS*

- (a) Check DTCs or sensor check codes.
- (1) Write down the DTCs or sensor check codes.
- (b) Clear the DTCs or sensor check codes.
- (c) Check whether the DTCs or sensor check codes recur.
- (1) Reproduce the problem symptoms in accordance with the DTCs or sensor check codes that were written down, and check whether the DTCs or sensor check codes recur.

HINT:
Refer to the DTC chart when any DTCs or sensor check codes are output.

Result

Result	Proceed to
DTC or sensor check code is not output	A
DTC or sensor check code is output	B

B

Go to step 8

A

6

REFER TO PROBLEM SYMPTOMS TABLE

Result

Result	Proceed to
Fault not listed in problem symptoms table	A
Fault listed in problem symptoms table	B

B

Go to step 8

A

7

OVERALL ANALYSIS AND TROUBLESHOOTING*

AC

- (a) DATA LIST / ACTIVE TEST (see page AC-34)
- (b) Panel diagnosis (indicator check) (see page AC-31)
- (c) Panel diagnosis (actuator check) (see page AC-31)
- (d) Panel diagnosis (sensor check) (see page AC-31)
- (e) Terminals of ECU (see page AC-24)

NEXT

8

ADJUST, REPAIR OR REPLACE

NEXT

9

CONFIRMATION TEST

NEXT

END

HOW TO PROCEED WITH TROUBLESHOOTING

(2006/01-)

HINT:

- Use these procedures to troubleshoot the air conditioning system.
- *: Use the intelligent tester.

1 VEHICLE BROUGHT TO WORKSHOP

NEXT

2 CUSTOMER PROBLEM ANALYSIS AND SYMPTOM CHECK

NEXT

3 INSPECT BATTERY VOLTAGE

Standard voltage:

11 to 14 V

If the voltage is below 11 V, recharge or replace the battery before proceeding.

NEXT

4 CHECK CAN COMMUNICATION SYSTEM*

AC

- (a) Use the intelligent tester to check if the CAN communication system is functioning.

Result

Result	Proceed to
CAN DTC is not output	A
CAN DTC is output	B

B

Go to CAN COMMUNICATION SYSTEM

A

5 CHECK DTC OR CHECK SENSOR CHECK CODE THROUGH PANEL DIAGNOSIS*

- (a) Check DTCs or sensor check codes.
- (1) Write down the DTCs or sensor check codes.
- (b) Clear the DTCs or sensor check codes.
- (c) Check whether the DTCs or sensor check codes recur.
- (1) Reproduce the problem symptoms in accordance with the DTCs or sensor check codes that were written down, and check whether the DTCs or sensor check codes recur.

HINT:
Refer to the DTC chart when any DTCs or sensor check codes are output.

Result

Result	Proceed to
DTC or sensor check code is not output	A
DTC or sensor check code is output	B

B

Go to step 8

A

6

REFER TO PROBLEM SYMPTOMS TABLE

Result

Result	Proceed to
Fault is not listed in problem symptoms table	A
Fault is listed in problem symptoms table	B

B

Go to step 8

A

7

OVERALL ANALYSIS AND TROUBLESHOOTING*

- (a) DATA LIST / ACTIVE TEST (see page AC-37)
- (b) Panel diagnosis (indicator check) (see page AC-31)
- (c) Panel diagnosis (sensor check) (see page AC-31)
- (d) Panel diagnosis (actuator check) (see page AC-31)
- (e) Terminals of ECU (see page AC-27)

NEXT

8

ADJUST, REPAIR OR REPLACE

NEXT

9

CONFIRMATION TEST

NEXT

END

CUSTOMIZE PARAMETERS

HINT:

The following items can be customized.

NOTICE:

- When the customer requests a change in a function, first make sure that the function can be customized.
- Be sure to make a note of the current settings before customizing.
- When troubleshooting a function, first make sure that the function is set to the default setting.

Air conditioning system

Display (Item)	Default	Contents	Setting
SET TEMP SHIFT (Set Temperature Shift)	NORMAL	To control with shifted temperature against display temperature	+2 C / +1 C / NORMAL / -1 C / -2 C
AIR INLET MODE (Air Inlet Mode)	AUTO	In case of turning A/C ON when you desire to make compartment cool down quickly, this is function to change mode automatically to RECIRCULATION mode	MANUAL / AUTO
COMPRESSOR MODE (Compressor Mode)	AUTO	Function to turn A/C ON automatically by pressing AUTO button when blower is ON and A/C is OFF	MANUAL / AUTO
COMPRS / DEF OPER (Compressor / Air Inlet DEF Operation)	LINK	Function to turn A/C ON automatically linked with FRONT DEF button when A/C is OFF	NORMAL / LINK
EVAP CTRL (Evaporator Control)	AUTO	Function to set evaporator control to AUTOMATIC position (AUTO) to save power, or to coldest position (MANUAL) to dehumidify air and to prevent windows from fogging up	MANUAL / AUTO
FOOT / DEF MODE (Foot / DEF auto mode)	ON	Function to turn airflow from FOOT / DEF ON automatically when AUTO MODE is ON	OFF / ON
AUTO BLOW UP (Foot / DEF automatic blower up function)	ON	Function to change blower level automatically when defroster is ON	OFF / ON

PROBLEM SYMPTOMS TABLE

(2005/11-2006/01)

HINT:

- Use the table below to help determine the cause of the problem symptom. The potential causes of the symptoms are listed in order of probability in the "Suspected area" column of the table. Check each symptom by checking the suspected areas in the order they are listed. Replace parts as necessary.
- Inspect the fuses and relays related to this system before inspecting the suspected areas below.

Air conditioning system

Symptom	Suspected area	See page
No functions of A/C panel operate	1. LIN communication line	-
	2. Air conditioning control assembly	AC-240
	3. Air conditioning amplifier	AC-24
No functions of A/C system operate	1. ECU-IG2 fuse	-
	2. Air conditioning control assembly	AC-240
	3. Air conditioning amplifier	AC-24
	4. Wire harness or connector	-
Airflow Control: No blower control (Blower motor does not operate)	1. HTR fuse	-
	2. Blower motor circuit	AC-90
	3. Air conditioning amplifier	AC-24
	4. Air conditioning control assembly	AC-240
	5. Wire harness or connector	-
Airflow Control: No blower control (Blower motor does not change speed)	1. Blower motor circuit	AC-90
	2. Air conditioning amplifier	AC-24
	3. Air conditioning control assembly	AC-240
Temperature Control: No cool air comes out	1. Refrigerant volume	-
	2. Refrigerant pressure	-
	3. Air conditioning pressure sensor	AC-59
	4. Compressor and pulley	AC-215
	5. Driver side air mix damper control servo motor circuit	AC-73
	6. Passenger side air mix damper control servo motor circuit	AC-67
	7. Evaporator temperature sensor circuit	AC-50
	8. Room temperature sensor circuit	AC-43
	9. Ambient temperature sensor circuit	AC-46
	10. Expansion valve	-
	11. Air conditioning amplifier	AC-24
	12. Air conditioning control assembly	AC-240
	13. ECM	ES-427
	14. LIN communication line	-
	15. CAN communication system	CA-75

Symptom	Suspected area	See page
Temperature Control: No warm air comes out	1. Driver side air mix damper control servo motor circuit	AC-73
	2. Passenger side air mix damper control servo motor circuit	AC-67
	3. Air conditioning harness	-
	4. Room temperature sensor circuit	AC-43
	5. Air conditioning amplifier	AC-24
	6. Air conditioning control assembly	AC-240
	7. ECM	ES-427
	8. LIN communication line	-
	9. CAN communication system	CA-75
Temperature Control: Output air is warmer or cooler than set temperature or response is slow	1. Driver side solar sensor circuit	AC-73
	2. Passenger side solar sensor circuit	AC-67
	3. Room temperature sensor circuit	AC-43
	4. Air inlet damper control servo motor circuit	AC-69
	5. Heater radiator	-
	6. Expansion valve	-
	7. Air conditioning amplifier	AC-24
	8. Air conditioning control assembly	AC-240
	9. ECM	ES-427
	10. LIN communication line	-
	11. CAN communication system	CA-75
Temperature Control: No temperature control (Only Max. cool or Max. warm)	1. Driver side solar sensor circuit	AC-64
	2. Passenger side solar sensor circuit	AC-53
	3. Air conditioning amplifier	AC-24
	4. Air conditioning control assembly	AC-240
	5. LIN communication line	-
No air inlet control	1. Air conditioning control assembly	AC-240
	2. Air inlet damper control servo motor circuit	AC-69
	3. Evaporator temperature sensor circuit	AC-50
	4. Air conditioning amplifier	AC-24
Diagnostic trouble codes are not recorded. Set mode is cleared when ignition switch turned to LOCK	1. Air conditioning amplifier	AC-24
	2. Back-up power source circuit	AC-100

PROBLEM SYMPTOMS TABLE

(2006/01-)

HINT:

- Use the table below to help determine the cause of the problem symptom. The potential causes of the symptoms are listed in order of probability in the "Suspected area" column of the table. Check each symptom by checking the suspected areas in the order they are listed. Replace parts as necessary.
- Inspect the fuses and relays related to this system before inspecting the suspected areas below.

Air conditioning system

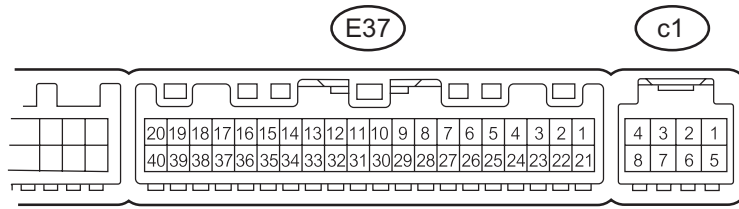
Symptom	Suspected area	See page
No functions of A/C panel operate	1. LIN communication line	-
	2. Air conditioning control assembly	AC-87
	3. Air conditioning amplifier	AC-27
No functions of A/C system operate	1. ECU-IG2 fuse	-
	2. Air conditioning control assembly	AC-87
	3. Air conditioning amplifier	AC-27
	4. Wire harness or connector	-
Airflow Control: No blower control (Blower motor does not operate)	1. HTR fuse	-
	2. Blower motor circuit	AC-90
	3. Air conditioning amplifier	AC-27
	4. Air conditioning control assembly	AC-87
	5. Wire harness or connector	-
Airflow Control: No blower control (Blower motor does not change speed)	1. Blower motor circuit	AC-90
	2. Air conditioning amplifier	AC-27
	3. Air conditioning control assembly	AC-87
Temperature Control: No cool air comes out	1. Refrigerant volume	-
	2. Refrigerant pressure	-
	3. Air conditioning pressure sensor	AC-59
	4. Compressor and pulley (for 2AZ-FE)	AC-79
	5. Compressor and magnetic clutch (for 2GR-FE)	AC-79
	6. Compressor circuit (for 2GR-FE)	AC-95
	7. Driver side air mix damper control servo motor circuit	AC-73
	8. Passenger side air mix damper control servo motor circuit	AC-67
	9. Evaporator temperature sensor circuit	AC-50
	10. Room temperature sensor circuit	AC-43
	11. Ambient temperature sensor circuit	AC-46
	12. Expansion valve	-
	13. Air conditioning amplifier	AC-27
	14. Air conditioning control assembly	AC-87
	15. ECM (for 2AZ-FE)	ES-1
	16. ECM (for 2GR-FE)	ES-1
	17. LIN communication line	-
	18. CAN communication system	CA-1

Symptom	Suspected area	See page
Temperature Control: No warm air comes out	1. Driver side air mix damper control servo motor circuit	AC-73
	2. Passenger side air mix damper control servo motor circuit	AC-67
	3. Air conditioning harness	-
	4. Room temperature sensor circuit	AC-43
	5. Air conditioning amplifier	AC-27
	6. Air conditioning control assembly	AC-87
	7. ECM (for 2AZ-FE)	ES-1
	8. ECM (for 2GR-FE)	ES-1
	9. LIN communication line	-
	10. CAN communication system	CA-1
Temperature Control: Output air is warmer or cooler than set temperature or response is slow	1. Driver side solar sensor circuit	AC-64
	2. Passenger side solar sensor circuit	AC-53
	3. Room temperature sensor circuit	AC-43
	4. Air inlet damper control servo motor circuit	AC-69
	5. Heater radiator	-
	6. Expansion valve	-
	7. Air conditioning amplifier	AC-27
	8. Air conditioning control assembly	AC-87
	9. ECM (for 2AZ-FE)	ES-1
	10. ECM (for 2GR-FE)	ES-1
	11. LIN communication line	-
	12. CAN communication system	CA-1
Temperature Control: No temperature control (Only Max. cool or Max. warm)	1. Driver side solar sensor circuit	AC-64
	2. Passenger side solar sensor circuit	AC-53
	3. Air conditioning amplifier	AC-27
	4. Air conditioning control assembly	AC-87
	5. LIN communication line	-
No air inlet control	1. Air conditioning control assembly	AC-87
	2. Air inlet damper control servo motor circuit	AC-69
	3. Evaporator temperature sensor circuit	AC-50
	4. Air conditioning amplifier	AC-27
Engine idle up does not occur, or is continuous.	1. Compressor circuit (for 2GR-FE)	AC-95
	2. ECM (for 2AZ-FE)	ES-1
	3. ECM (for 2GR-FE)	ES-1
Diagnostic trouble codes are not recorded. Set mode is cleared when ignition switch turned to LOCK	1. Air conditioning amplifier	AC-27
	2. Back-up power source circuit	AC-100

TERMINALS OF ECU

(2005/11-2006/01)

1. CHECK AIR CONDITIONING AMPLIFIER



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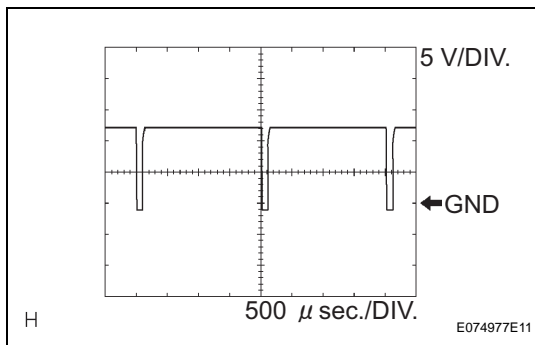
- (a) Measure the voltage and resistance of the connectors.

HINT:

Check from the rear of the connector while it is connected to the air conditioning amplifier.

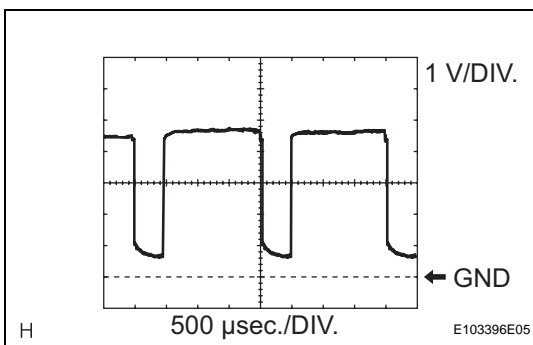
Symbols (Terminal No.)	Wiring Color	Terminal Description	Condition	Specified Condition
B (E37-21) - GND (E37-14)	R - W-B	Power source (Back-up)	Always	10 to 14 V
SOL+ (E37-2) - GND (E37-14)	GR - W-B	A/C compressor operation signal	Engine idling Blower switch LO A/C switch ON	Pulse generation (see waveform 1)
BLW (E37-23) - GND (E37-14)	R - W-B	Blower motor control signal	Ignition switch ON Blower switch LO	Pulse generation (see waveform 2)
PRE (E37-9) - SG-2 (E37-13)	L - G	Air conditioning pressure sensor signal	Refrigerant pressure: Normal	0.76 to 4.74 V
PRE (E37-9) - SG-2 (E37-13)	L - G	Air conditioning pressure sensor signal	Refrigerant pressure: Abnormal (less than 0.196 MPa [2.0 kgf/cm ² , 28 psi])	Below 0.76 V
PRE (E37-9) - SG-2 (E37-13)	L - G	Air conditioning pressure sensor signal	Refrigerant pressure: Abnormal (more than 3.14 MPa [32 kgf/cm ² , 455 psi])	4.74 V or higher
TSD (E37-33) - S5-4 (E37-31)	L - LG	Driver side solar sensor signal	Ignition switch ON Solar sensor subject to electric light	0.8 to 4.3 V
TSP (E37-32) - S5-4 (E37-31)	P - LG	Passenger side solar sensor signal	Ignition switch ON Solar sensor subject to electric light	0.8 to 4.3 V
TR (E37-29) - SG-1 (E37-34)	CR - V	Room temperature sensor signal	Ignition switch ON Vehicle interior temperature: 25°C (77°F)	1.8 to 2.2 V
SG-1 (E37-34) - Body ground	V - Body ground	Ground for room temperature sensor	Always	Below 1 Ω
GND (E37-14) - Body ground	W-B - Body ground	Ground for main power supply	Always	Below 1 Ω
IG+ (E37-1) - GND (E37-14)	Y - W-B	Power source (IG)	Ignition switch ON	10 to 14 V
S5-3 (E37-10) - GND (E37-14)	B - W-B	Power supply for pressure sensor	Ignition switch ON	4.5 to 5.5 V
CANH (E37-11) - GND (E37-14)	V - W-B	Hi-level CAN bus line	Ignition switch ON	Pulse generation (see waveform 3)

Symbols (Terminal No.)	Wiring Color	Terminal Description	Condition	Specified Condition
CANL (E37-12) - GND (E37-14)	W - W-B	Lo-level CAN bus line	Ignition switch ON	Pulse generation (see waveform 4)
SG-2 (E37-13) - Body ground	G - Body ground	Ground for pressure sensor	Always	Below 1 Ω
RDFG (E37-38) - GND (E37-14)	B - W-B	Rear defogger switch signal	Ignition switch ON Rear defogger switch OFF	10 to 14 V
RDFG (E37-38) - GND (E37-14)	B - W-B	Rear defogger switch signal	Ignition switch ON Rear defogger switch ON	Below 1 Ω
LIN1 (E37-37) - GND (E37-14)	B - W-B	LIN communication signal	Ignition switch ON	Pulse generation
BUS G (c1-2) - Body ground	-	Ground for BUS IC	Always	Below 1 Ω
BUS (c1-3) - BUS G (c1-2)	-	BUS IC control signal	Ignition switch ON	Pulse generation
B BUS (c1-4) - BUS G (c1-2)	-	Power supply for BUS IC	Ignition switch ON	11 to 13 V
SGA (c1-5) - Body ground	-	Ground for evaporator temperature sensor	Always	Below 1 Ω
TEA (c1-6) - SGA (c1-5)	-	Evaporator temperature sensor signal	Ignition switch ON Evaporator temperature: 15°C (59°F)	1.4 to 1.8 V



(b) Using an oscilloscope, check waveform 1.
Compressor and pulley operation signal

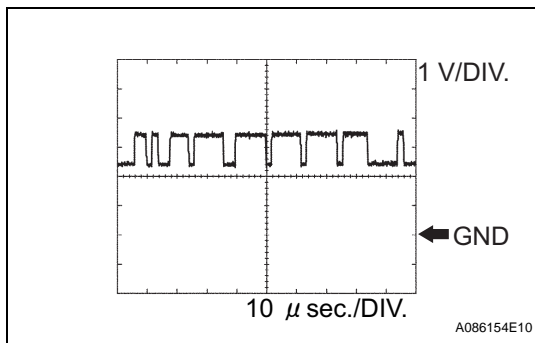
Item	Content
Symbols (Terminal No.)	SOL+ (E37-2) - GND (E37-14)
Tool Setting	5 V/DIV., 500 μ sec./DIV.
Condition	Engine idling, Blower switch LO, A/C switch ON



(c) Using an oscilloscope, check waveform 2.
Blower motor control signal

Item	Content
Symbols (Terminal No.)	BLW (E37-23) - GND (E37-14)
Tool Setting	1 V/DIV., 500 μ sec./DIV.
Condition	Ignition switch ON, Blower switch LO

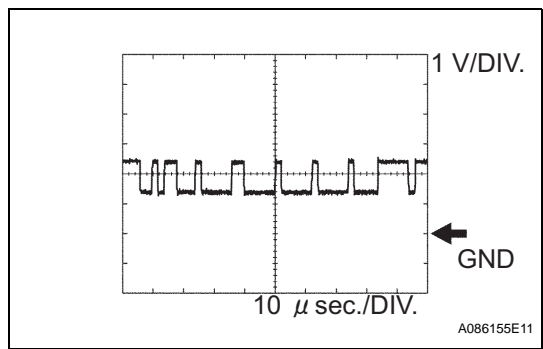
HINT:
When the blower level is increased, the duty ratio changes accordingly.



(d) Using an oscilloscope, check waveform 3.
CAN communication signal

Item	Content
Symbols (Terminal No.)	CANH (E37-11) - GND (E37-14)
Tool Setting	1 V/DIV., 10 μ sec./DIV.
Condition	Ignition switch ON

HINT:
The waveform varies depending on the CAN communication signal.

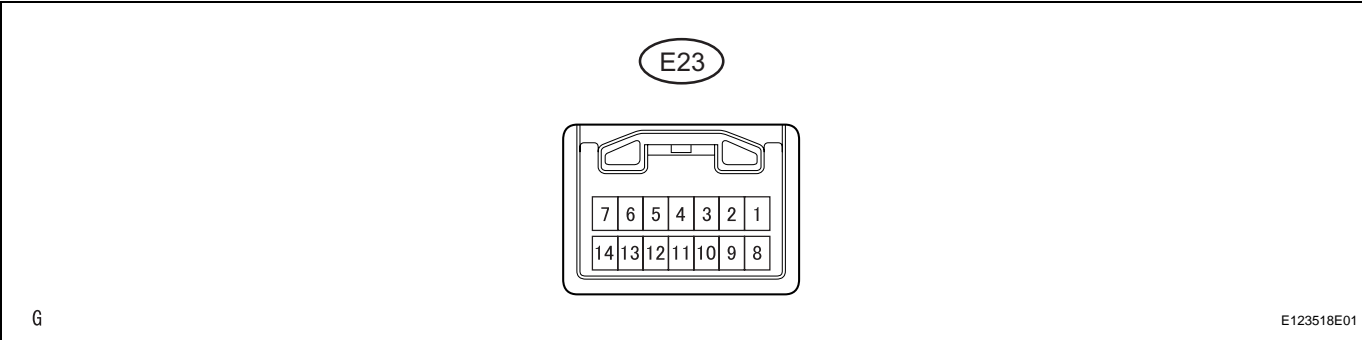


(e) Using an oscilloscope, check waveform 4.
CAN communication signal

Item	Content
Symbols (Terminal No.)	CANL (E37-12) - GND (E37-14)
Tool Setting	1 V/DIV., 10 μsec./DIV.
Condition	Ignition switch ON

HINT:
The waveform varies depending on the CAN communication signal.

2. CHECK AIR CONDITIONING CONTROL



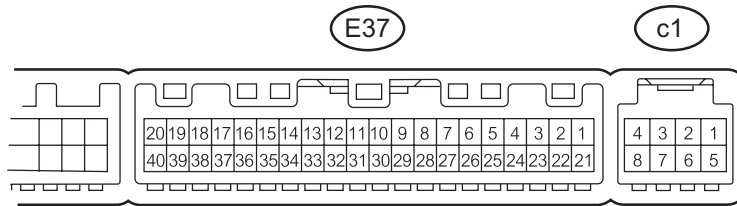
(a) Measure the voltage and resistance of the connectors.

Symbols (Terminal No.)	Wiring Color	Terminal Description	Condition	Specified Condition
IG+ (E23-2) - GND (E23-7)	L - W-B	Power source (IG)	Ignition switch ON	10 to 14 V
GND (E23-7) - Body ground	W-B - Body ground	Ground for air conditioning control assembly	Always	Below 1 Ω
LIN1 (E23-11) - GND (E23-7)	B - W-B	LIN communication signal	Ignition switch ON	Pulse generation
+B (E23-1) - GND (E23-7)	R - W-B	Power source (Back-up)	Always	10 to 14 V
ACC (E23-8) - GND (E23-7)	GR - W-B	ACC power supply	Always	Below 1 Ω

TERMINALS OF ECU

(2006/01-)

1. CHECK AIR CONDITIONING AMPLIFIER



E115964E03

- (a) Measure the voltage and resistance of the connectors.

HINT:

Check from the rear of the connector while it is connected to the air conditioning amplifier.

Symbols (Terminal No.)	Wiring Color	Terminal Description	Condition	Specified Condition
B (E37-21) - GND (E37-14)	R - W-B	Power source (Back-up)	Always	10 to 14 V
SOL+ (E37-2) - GND (E37-14)	GR - W-B	A/C compressor operation signal	Engine idling	Pulse generation (see waveform 1)
			Blower switch LO	
			A/C switch ON	
BLW (E37-23) - GND (E37-14)	R - W-B	Blower motor control signal	Ignition switch ON	Pulse generation (see waveform 2)
			Blower switch LO	
PRE (E37-9) - SG-2 (E37-13)	L - G	Air conditioning pressure sensor signal	Refrigerant pressure: Normal	0.76 to 4.74 V
PRE (E37-9) - SG-2 (E37-13)	L - G	Air conditioning pressure sensor signal	Refrigerant pressure: Abnormal (less than 0.196 MPa [2.0 kgf/cm ² , 28 psi])	Below 0.76 V
PRE (E37-9) - SG-2 (E37-13)	L - G	Air conditioning pressure sensor signal	Refrigerant pressure: Abnormal (more than 3.14 MPa [32 kgf/cm ² , 455 psi])	4.74 V or higher
TSD (E37-33) - S5-4 (E37-31)	L - LG	Driver side solar sensor signal	Ignition switch ON	0.8 to 4.3 V
			Solar sensor subject to electric light	
TSP (E37-32) - S5-4 (E37-31)	P - LG	Passenger side solar sensor signal	Ignition switch ON	0.8 to 4.3 V
			Solar sensor subject to electric light	
TR (E37-29) - SG-1 (E37-34)	CR - V	Room temperature sensor signal	Ignition switch ON	1.8 to 2.2 V
			Vehicle interior temperature: 25°C (77°F)	
SG-1 (E37-34) - Body ground	V - Body ground	Ground for room temperature sensor	Always	Below 1 Ω
GND (E37-14) - Body ground	W-B - Body ground	Ground for main power supply	Always	Below 1 Ω
IG+ (E37-1) - GND (E37-14)	Y - W-B	Power source (IG)	Ignition switch ON	10 to 14 V
S5-3 (E37-10) - GND (E37-14)	B - W-B	Power supply for pressure sensor	Ignition switch ON	4.5 to 5.5 V
CANH (E37-11) - GND (E37-14)	V - W-B	Hi-level CAN bus line	Ignition switch ON	Pulse generation (see waveform 3)

AC

Symbols (Terminal No.)	Wiring Color	Terminal Description	Condition	Specified Condition
CANL (E37-12) - GND (E37-14)	W - W-B	Lo-level CAN bus line	Ignition switch ON	Pulse generation (see waveform 4)
SG-2 (E37-13) - Body ground	G - Body ground	Ground for pressure sensor	Always	Below 1 Ω
RDFG (E37-38) - GND (E37-14)	B - W-B	Rear defogger switch signal	Ignition switch ON Rear defogger switch OFF	10 to 14 V
RDFG (E37-38) - GND (E37-14)	B - W-B	Rear defogger switch signal	Ignition switch ON Rear defogger switch ON	Below 1 V
LIN1 (E37-37) - GND (E37-14)	B - W-B	LIN communication signal	Ignition switch ON	Pulse generation
BUS G (c1-2) - Body ground	-	Ground for BUS IC	Always	Below 1 Ω
BUS (c1-3) - BUS G (c1-2)	-	BUS IC control signal	Ignition switch ON	Pulse generation
B BUS (c1-4) - BUS G (c1-2)	-	Power supply for BUS IC	Ignition switch ON	11 to 13 V
SGA (c1-5) - Body ground	-	Ground for evaporator temperature sensor	Always	Below 1 Ω
TEA (c1-6) - SGA (c1-5)	-	Evaporator temperature sensor signal	Ignition switch ON Evaporator temperature: 15°C (59°F)	1.4 to 1.8 V
LOCK (E37-8)* - SG-2 (E37-13)	W - G	Compressor lock sensor signal	Ignition switch ON AUTO switch ON A/C switch ON Magnetic clutch ON	Pulse generation (see waveform 5)
MGC (E37-20)* - GND (E37-14)	V - W-B	Magnetic clutch relay signal	Ignition switch ON Magnetic clutch OFF	10 to 14 V
MGC (E37-20)* - GND (E37-14)	V - W-B	Magnetic clutch relay signal	Ignition switch ON Magnetic clutch ON	Below 1.5 V

HINT:

*: for 2GR-FE

- (b) Using an oscilloscope, check waveform 1.

A/C Compressor* operation signal

Item	Content
Symbols (Terminal No.)	SOL+ (E37-2) - GND (E37-14)
Tool Setting	5 V/DIV., 500 μ sec./DIV.
Condition	Engine idling, Blower switch LO, A/C switch ON

HINT:

*: Compressor and pulley for 2AZ-FE, Compressor and magnetic clutch for 2GR-FE.

- (c) Using an oscilloscope, check waveform 2.

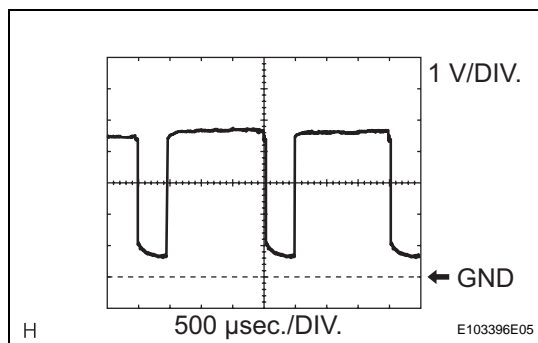
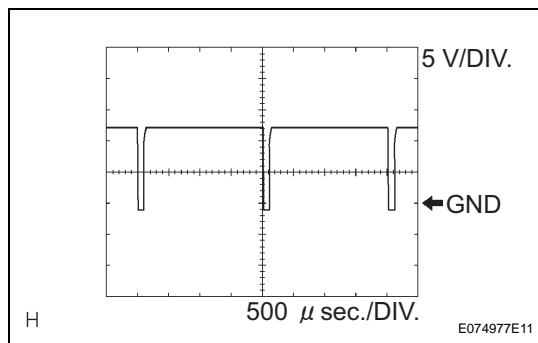
Blower motor control signal

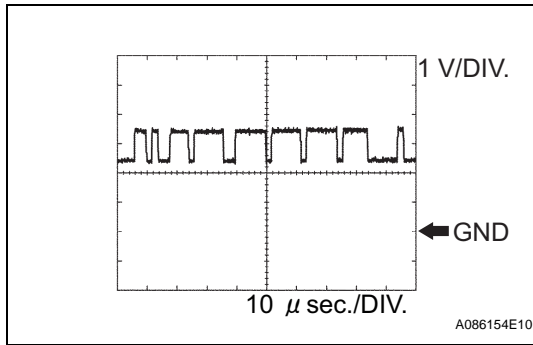
Item	Content
Symbols (Terminal No.)	BLW (E37-23) - GND (E37-14)
Tool Setting	1 V/DIV., 500 μ sec./DIV.
Condition	Ignition switch ON, Blower switch LO

HINT:

When the blower level is increased, the duty ratio changes accordingly.

AC



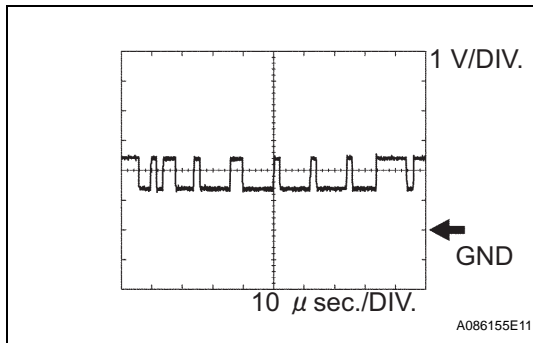


- (d) Using an oscilloscope, check waveform 3.
CAN communication signal

Item	Content
Symbols (Terminal No.)	CANH (E37-11) - GND (E37-14)
Tool Setting	1 V/DIV., 10 μsec./DIV.
Condition	Ignition switch ON

HINT:

The waveform varies depending on the CAN communication signal.

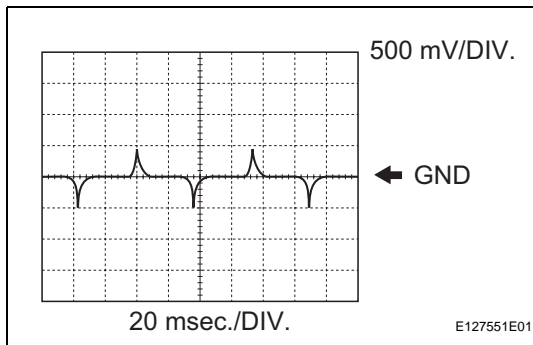


- (e) Using an oscilloscope, check waveform 4.
CAN communication signal

Item	Content
Symbols (Terminal No.)	CANL (E37-12) - GND (E37-14)
Tool Setting	1 V/DIV., 10 μsec./DIV.
Condition	Ignition switch ON

HINT:

The waveform varies depending on the CAN communication signal.



- (f) Using an oscilloscope, check waveform 5.
Compressor lock sensor signal*

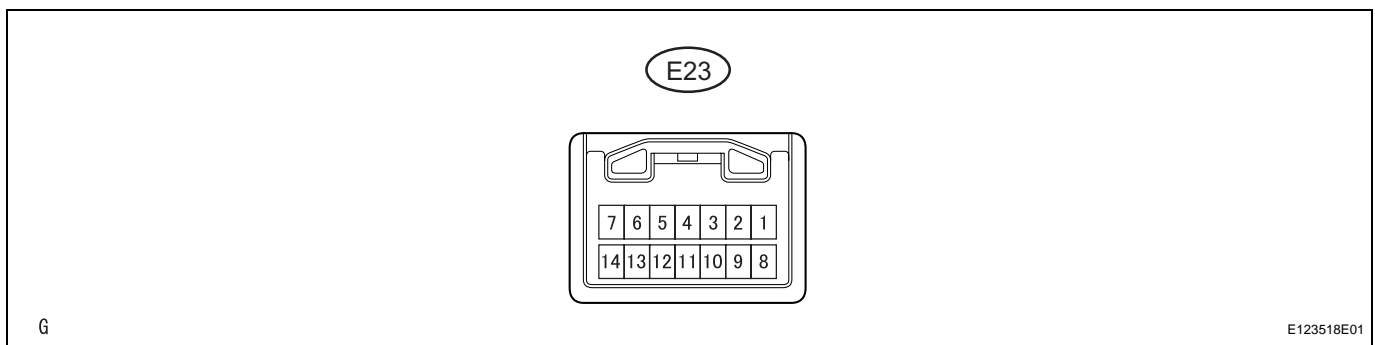
Item	Content
Symbols (Terminal No.)	LOCK (E37-8)* - SG-2 (E37-13)
Tool Setting	500 mV/DIV., 20 msec./DIV.
Condition	Ignition switch ON, AUTO switch ON, A/C switch ON, Magnetic clutch ON

HINT:

*: for 2GR-FE

2. CHECK AIR CONDITIONING CONTROL

AC



- (a) Measure the voltage and resistance of the connectors.

Symbols (Terminal No.)	Wiring Color	Terminal Description	Condition	Specified Condition
IG+ (E23-2) - GND (E23-7)	L - W-B	Power source (IG)	Ignition switch ON	10 to 14 V
GND (E23-7) - Body ground	W-B - Body ground	Ground for air conditioning control assembly	Always	Below 1 Ω
LIN1 (E23-11) - GND (E23-7)	B - W-B	LIN communication signal	Ignition switch ON	Pulse generation
+B (E23-1) - GND (E23-7)	R - W-B	Power source (Back-up)	Always	10 to 14 V

Symbols (Terminal No.)	Wiring Color	Terminal Description	Condition	Specified Condition
ACC (E23-8) - GND (E23-7)	GR - W-B	ACC power supply	Always	Below 1 Ω

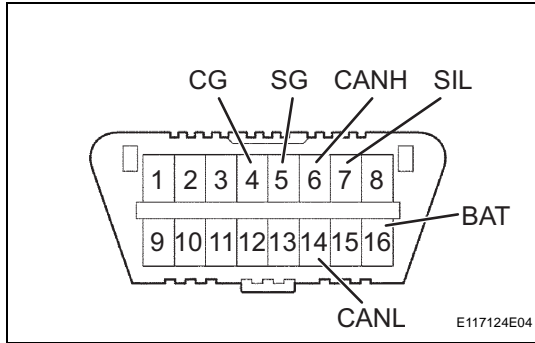
DIAGNOSIS SYSTEM

1. DESCRIPTION

- (a) Air conditioning system data and the Diagnostic Trouble Codes (DTCs) can be read through the Data Link Connector 3 (DLC3) of the vehicle. When the system seems to be malfunctioning, use the intelligent tester to check for malfunctions and perform troubleshooting.

2. CHECK DLC3

The vehicle's ECM uses the ISO 15765-4 for communication protocol. The terminal arrangement of the DLC3 complies with SAE J1962 and matches the ISO 15765-4 format.



Symbols (Terminal No.)	Terminal Description	Condition	Specified Condition
SIL (7) - SG (5)	Bus "+" line	During transmission	Pulse generation
CG (4) - Body ground	Chassis ground	Always	Below 1 Ω
SG (5) - Body ground	Signal ground	Always	Below 1 Ω
BAT (16) - Body ground	Battery positive	Always	10 to 14 V
CANH (6) - CANL (14)	CAN bus line	Ignition switch LOCK*	54 to 69 Ω
CANH (6) - CG (4)	HIGH-level CAN bus line	Ignition switch LOCK*	200 Ω or higher
CANH (6) - BAT (16)	HIGH-level CAN bus line	Ignition switch LOCK*	1 M Ω or higher
CANL (14) - CG (4)	LOW-level CAN bus line	Ignition switch LOCK*	200 Ω or higher
CANL (14) - BAT (16)	LOW-level CAN bus line	Ignition switch LOCK*	1 M Ω or higher

If the result is not as specified, the DLC3 may have a malfunction. Repair or replace the harness and connector.

NOTICE:

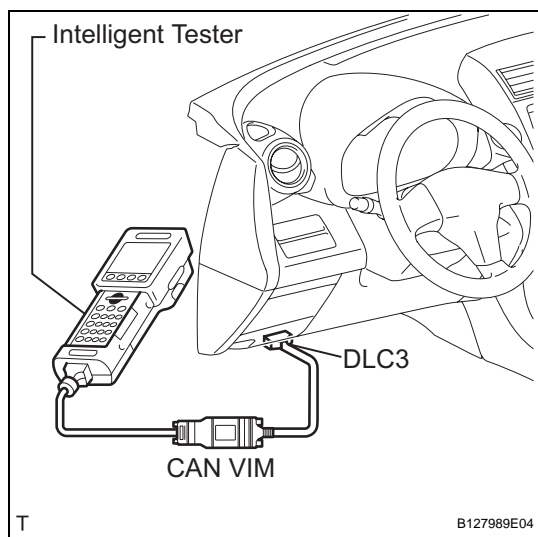
***: Before measuring the resistance, leave the vehicle as is for at least 1 minute and do not operate the ignition switch, other switches or doors.**

HINT:

Connect the cable of the intelligent tester (with CAN VIM) to the DLC3, turn the ignition switch ON and attempt to use the tester. If the display indicates that a communication error has occurred, there is a problem either with the vehicle or with the tester.

If communication is normal when the tester is connected to another vehicle, inspect the DLC3 of the original vehicle.

If communication is still not possible when the tester is connected to another vehicle, the problem may be in the tester itself. Consult the Service Department listed in the tester's instruction manual.



DTC CHECK / CLEAR

1. CHECK DTC

- Connect the intelligent tester (with CAN VIM) to the DLC3.
- Turn the ignition switch ON and turn the intelligent tester ON.
- Read the DTC by following the prompts on the tester screen.

HINT:

Refer to the intelligent tester operator's manual for further details.

2. CLEAR DTC

- Connect the intelligent tester (with CAN VIM) to the DLC3.
- Turn the ignition switch ON and turn the intelligent tester ON.
- Clear the DTC by following the prompts on the tester screen.

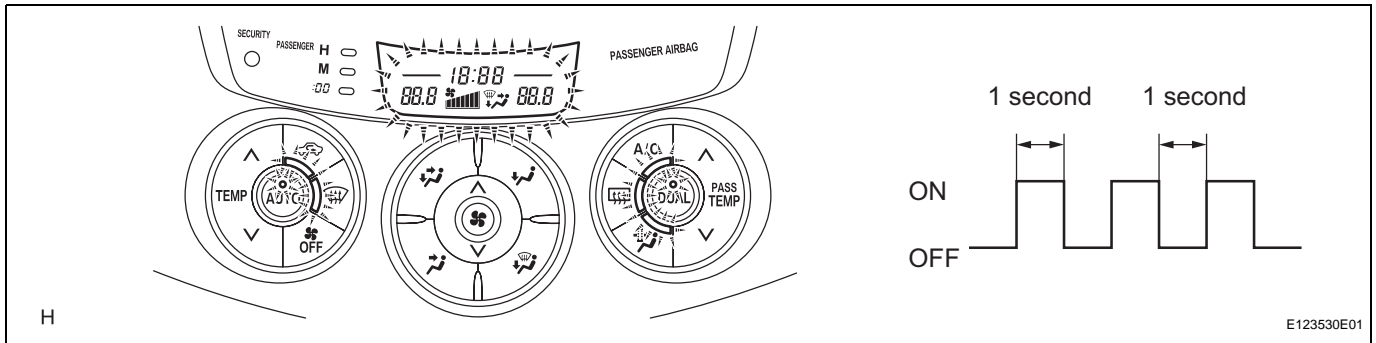
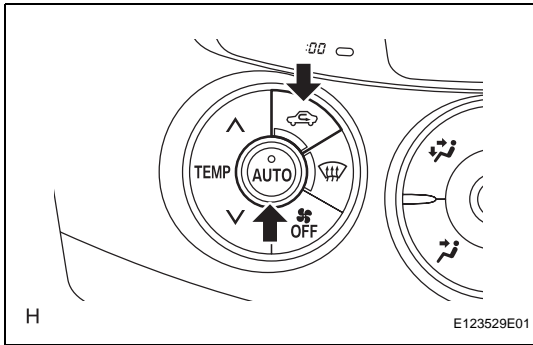
HINT:

Refer to the intelligent tester operator's manual for further details.

CHECK MODE PROCEDURE

1. PANEL DIAGNOSIS (INDICATOR CHECK)

- Turn the ignition switch to LOCK.
- Turn the ignition switch ON while simultaneously pressing the A/C control AUTO switch and the REC/FRS switch.
- Check that all indicators and the display area are turned on and off 4 times in succession at 1 second intervals.



HINT:

After the indicator check is completed, the system automatically enters sensor check mode.

- Press the OFF switch to terminate the panel diagnosis.

2. PANEL DIAGNOSIS (SENSOR CHECK)

- Perform the indicator check.

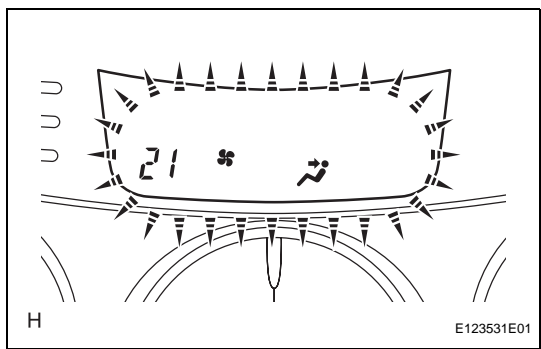
HINT:

After the indicator check is completed, the system automatically enters sensor check mode.

- Press the REC/FRS switch to enter actuator check mode.
- After the actuator check is completed, press the AUTO switch to enter sensor check mode.

NOTICE:

The sensor check must be performed again after the actuator check is completed because sensor check mode, which starts automatically after the indicator check, cannot fully detect malfunctions.



- (d) Check the sensor check results displayed on the set temperature display.

Results	Code Display
Present malfunction	Blinks
Past malfunction	Blinks

HINT:

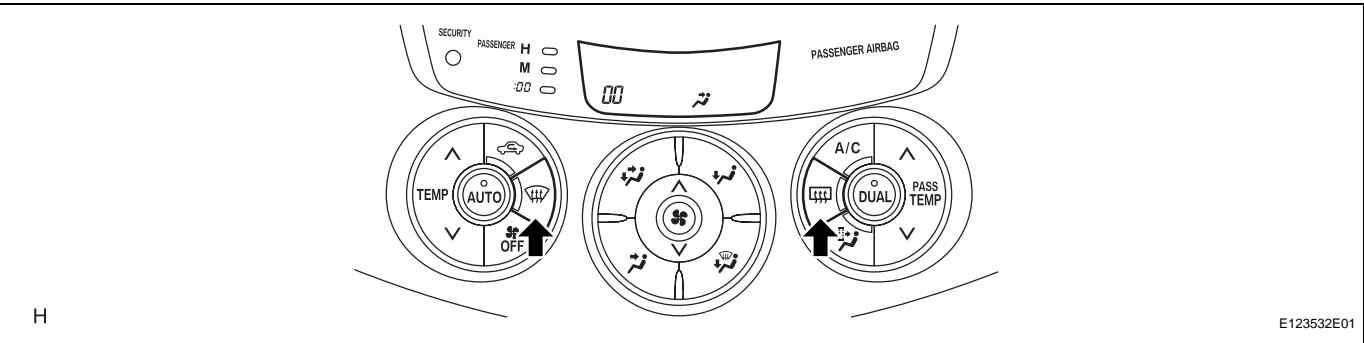
- The illustration shows the display when code 21 is output.
 - When 2 or more sensor check codes are detected, the codes are displayed in ascending numerical order.
 - In cases with 2 or more codes, if they are difficult to read, press the DEF switch to activate the step operation and display them one by one.
 - The codes are displayed in ascending numerical order as the DEF switch is pressed.
- (e) When any sensor check codes are displayed, refer to the DTC chart (see page AC-39).
- (f) Press the OFF switch to terminate the panel diagnosis.

HINT:

Pressing the REC/FRS switch returns the system to actuator check mode.

3. PANEL DIAGNOSIS (CLEAR SENSOR CHECK CODE)

- (a) Inspect, and repair or replace the malfunctioning parts.
- (b) Clear the sensor check codes.

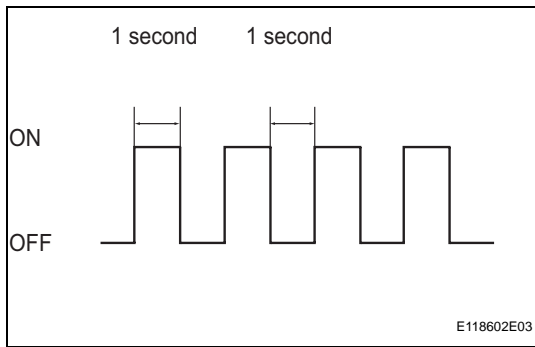


- (1) While pressing the DEF switch during sensor check mode, press the Rr DEF switch.

HINT:

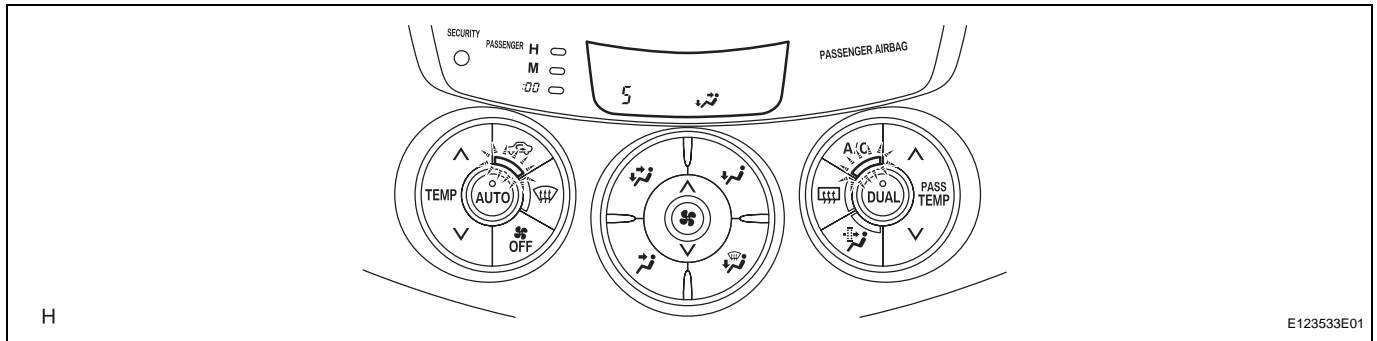
Sensor check codes can be cleared by removing the ECU-B2 fuse from the engine room No. 2 relay block for more than 60 seconds.

- (c) Perform the sensor check and confirm that normal code 00 is displayed.



4. PANEL DIAGNOSIS (ACTUATOR CHECK)

- Start the engine and warm it up.
- Perform the indicator check.
- When the sensor check is started after the indicator check, press the REC/FRS switch to start the actuator check.
HINT:
Perform the actuator check with the engine running.
- Check the temperature and blower levels by hand at each step while the actuator check proceeds from step 0 to 9 at 1 second intervals (continuous operation).



HINT:

Each step number is displayed on the set temperature display.

- To display step numbers one by one manually, press the DEF switch to activate the step operation. The step number changes each time the DEF switch is pressed.

HINT:

- Each step number blinks at 1 second intervals during the step operation.
- The illustration shows the display when step number 5 is displayed.

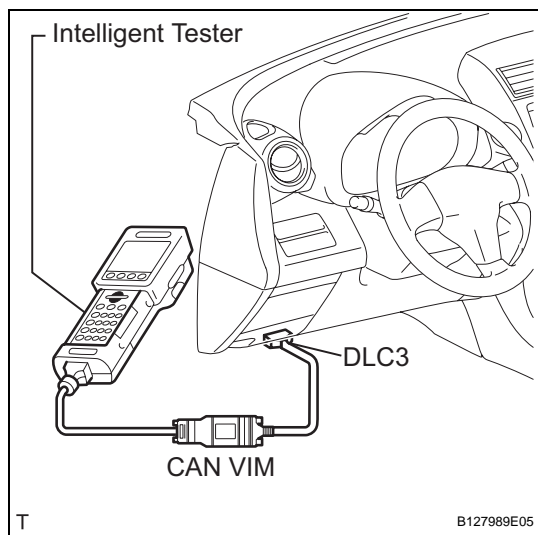
- Press the OFF switch to terminate the panel diagnosis.

HINT:

Pressing the AUTO switch returns to sensor check mode.

Step No.	Blower Level	Air Mix Damper	Air Flow Vent	Air Inlet Damper	Cool Air By-pass	Compressor
0	0	0% (MAX COLD)	FACE	FRESH	-	OFF
1	1	0% (MAX COLD)	FACE	FRESH	-	OFF
2	17	0% (MAX COLD)	FACE	RECIRCULATION / FRESH	-	ON
3	17	0% (MAX COLD)	FACE	RECIRCULATION	-	ON
4	17	50%	BI-LEVEL	RECIRCULATION	-	ON
5	17	50%	BI-LEVEL	RECIRCULATION	-	ON
6	17	50%	FOOT	FRESH	-	ON
7	17	100% (MAX HOT)	FOOT	FRESH	-	ON

Step No.	Blower Level	Air Mix Damper	Air Flow Vent	Air Inlet Damper	Cool Air By-pass	Compressor
8	17	100% (MAX HOT)	FOOT/DEF	FRESH	-	ON
9	31	100% (MAX HOT)	DEF	FRESH	-	ON



DATA LIST / ACTIVE TEST

(2005/11-2006/01)

1. READ DATA LIST

HINT:

Using the intelligent tester's DATA LIST allows switch, sensor, actuator and other item values to be read without removing any parts. Reading the DATA LIST early in troubleshooting is one way to save time.

- Connect the intelligent tester (with CAN VIM) to the DLC3.
- Turn the ignition switch ON and turn the intelligent tester ON.
- Read the DATA LIST by following the prompts on the tester.

Air conditioning amplifier

Item	Measurement Item / Display (Range)	Normal Condition	Diagnostic Note
ROOM TEMP	Room temperature sensor / Min.: -6.5°C (20.3°F) Max.: 57.25°C (135.05°F)	Actual room temperature is displayed	Open circuit: -6.5°C (20.3°F) Short circuit: 57.25°C (135.05°F)
AMBI TEMP SENS	Ambient temperature sensor / Min.: -23.3°C (-9.94°F) Max.: 65.95°C (150.71°F)	Actual ambient temperature is displayed	Open circuit: -23.3°C (-9.94°F) Short circuit: 65.95°C (150.71°F)
SOLAR SENS-D	Driver side solar sensor / Min.: 0, Max.: 255	Driver side temperature increases as brightness increases	-
SOLAR SENS-P	Passenger side solar sensor / Min.: 0, Max.: 255	Passenger side temperature increases as brightness increases	-
COOLANT TEMP	Engine coolant temperature / Min.: 1.3°C (34.34°F) Max.: 90.55°C (194.99°F)	Actual engine coolant temperature is displayed after engine warmed up	-
SET TEMP-D	Driver side set temperature / Min.: 0°C (32°F) Max.: 30°C (54°F)	Driver side actual set temperature is displayed	-
SET TEMP-P	Passenger side set temperature / Min.: 0°C (32°F) Max.: 30°C (54°F)	Passenger side actual set temperature is displayed	-
ESTIMATE TEMP-D	Driver side estimated temperature / Min.: -358.4°C (-613.12°F) Max.: 358.4°C (677.12°F)	Driver side estimated temperature is displayed	-
ESTIMATE TEMP-P	Passenger side estimated temperature / Min.: -358.4°C (-613.12°F) Max.: 358.4°C (677.12°F)	Passenger side estimated temperature is displayed	-
BLOWER LEVEL	Blower motor speed level / Min.: 0, Max.: 31	Increases in range between 0 and 31 as blower motor speed increases	-
AMBI TEMP	Adjusted ambient temperature / Min.: -30.8°C (-23.44°F) Max.: 50.8°C (123.44°F)	-	-

Item	Measurement Item / Display (Range)	Normal Condition	Diagnostic Note
AIR MIX PULSE-D	Driver side air mix servo motor target pulse / Min.: 0, Max.: 255	Customized value displayed	-
AIR MIX PULSE-P	Passenger side air mix servo motor target pulse / Min.: 0, Max.: 255	Customized value displayed	-
AIR OUT PULSE	Air outlet servo motor target / Min.: 0, Max.: 255	Customized value displayed	-
A/I DAMP PLS	Air inlet damper target pulse / Min.: 0, Max.: 255	Customized value displayed	-
EVAP FIN TEMP	Evaporator temperature sensor / Min.: -29.7°C (-21.46°F) Max.: 59.6°C (139.28°F)	Actual evaporator temperature is displayed	Open circuit: -29.7°C (-21.46°F) Short circuit: 59.6°C (139.28°F)
REG PRESS SENS	Regulator pressure sensor / Min.: 0 MPaG Max.: 3.187 MPaG	Actual regulator pressure is displayed	-
REG CTRL CURRNT	Regulator control current / Min.: 0 A Max.: 0.997 A	Value changes between 0 A and 0.997 A in accordance with compressor and magnetic clutch operation	-
AIR INLET MODE	Air inlet mode / AUTO, MANUAL	Customized value displayed	-
COMPRESSOR MODE	Compressor mode / AUTO, MANUAL	Customized value displayed	-
COMPRS/DEF MODE	Compressor / DEF Mode / LINK, NORMAL	Customized value displayed	-
EVAP CTRL	Evaporator Control / AUTO, MANUAL	Customized value displayed	-
AUTO BLOW UP	Foot / DEF automatic blow up function / ON, OFF	Customized value displayed	-
FOOT/DEF MODE	Foot / DEF auto mode / ON, OFF	Customized value displayed	-
SET TEMP SHIFT	Shift set temperature / +2 C, +1 C, NORMAL, -1 C, -2 C	Customized value displayed	-
DESTINATION	Destination / DOMEST, USA, EUROPE, AUSTRAL, MIDEAST, NO INFO	Destinations displayed	-
#CODES	Number of trouble codes / Min.: 0, Max.: 255	Number of DTCs displayed	-

2. PERFORM ACTIVE TEST

HINT:

Performing the intelligent tester's ACTIVE TEST allows relay, VSV, actuator and other items to be operated without removing any parts. Performing the ACTIVE TEST early in troubleshooting is one way to save time. The DATA LIST can be displayed in the ACTIVE TEST.

- Connect the intelligent tester (with CAN VIM) to the DLC3.
- Turn the ignition switch ON and turn the intelligent tester ON.

- (c) Perform the ACTIVE TEST by following the prompts on the tester.

Air conditioning amplifier

Item	Test Details / Display (Range)	Diagnostic Note
BLOWER MOTOR	Blower motor / Min.: 0, Max.: 31	-
A/C COMPRESSOR	A/C compressor / OFF, ON	-
DEFOGGER RLY-R	Defogger relay (Rear) / OFF, ON	-
AIR MIX PULSE	Air mix servo motor pulse / Min.: 0, Max.: 255	-
AIR MIX PULSE-P	Air mix servo motor pulse (P side) / Min.: 0, Max.: 255	-
AIR OUT PULSE	Air outlet servo motor pulse / Min.: 0, Max.: 255	-
A/I DAMP PLS	Air inlet damper target pulse / Min.: 0, Max.: 255	-

DATA LIST / ACTIVE TEST

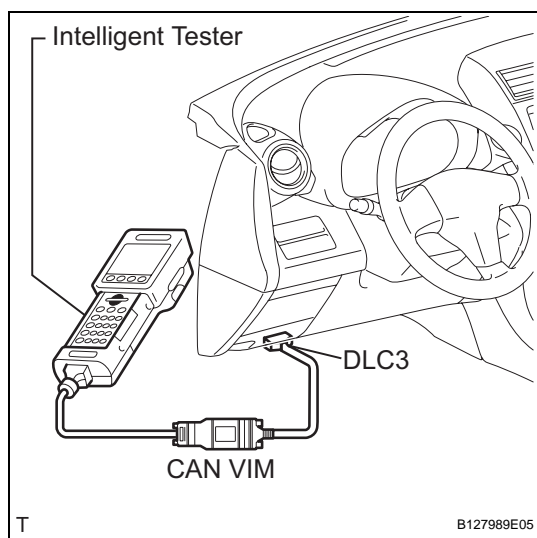
(2006/01-)

1. READ DATA LIST

HINT:

Using the intelligent tester's DATA LIST allows switch, sensor, actuator and other item values to be read without removing any parts. Reading the DATA LIST early in troubleshooting is one way to save time.

- Connect the intelligent tester (with CAN VIM) to the DLC3.
- Turn the ignition switch ON and turn the intelligent tester ON.
- Read the DATA LIST by following the prompts on the tester.



Air conditioning amplifier

Item	Measurement Item / Display (Range)	Normal Condition	Diagnostic Note
ROOM TEMP	Room temperature sensor / Min.: -6.5°C (20.3°F) Max.: 57.25°C (135.05°F)	Actual room temperature is displayed	Open circuit: -6.5°C (20.3°F) Short circuit: 57.25°C (135.05°F)
AMBI TEMP SENS	Ambient temperature sensor / Min.: -23.3°C (-9.94°F) Max.: 65.95°C (150.71°F)	Actual ambient temperature is displayed	Open circuit: -23.3°C (-9.94°F) Short circuit: 65.95°C (150.71°F)
SOLAR SENS-D	Driver side solar sensor / Min.: 0, Max.: 255	Driver side temperature increases as brightness increases	-
SOLAR SENS-P	Passenger side solar sensor / Min.: 0, Max.: 255	Passenger side temperature increases as brightness increases	-
COOLANT TEMP	Engine coolant temperature / Min.: 1.3°C (34.34°F) Max.: 90.55°C (194.99°F)	Actual engine coolant temperature is displayed after engine warmed up	-
SET TEMP-D	Driver side set temperature / Min.: 0°C (32°F) Max.: 30°C (54°F)	Driver side actual set temperature is displayed	-
SET TEMP-P	Passenger side set temperature / Min.: 0°C (32°F) Max.: 30°C (54°F)	Passenger side actual set temperature is displayed	-

Item	Measurement Item / Display (Range)	Normal Condition	Diagnostic Note
ESTIMATE TEMP-D	Driver side estimated temperature / Min.: -358.4°C (-613.12°F) Max.: 358.4°C (677.12°F)	Driver side estimated temperature is displayed	-
ESTIMATE TEMP-P	Passenger side estimated temperature / Min.: -358.4°C (-613.12°F) Max.: 358.4°C (677.12°F)	Passenger side estimated temperature is displayed	-
BLOWER LEVEL	Blower motor speed level / Min.: 0, Max.: 31	Increases in range between 0 and 31 as blower motor speed increases	-
AMBI TEMP	Adjusted ambient temperature / Min.: -30.8°C (-23.44°F) Max.: 50.8°C (123.44°F)	-	-
AIR MIX PULSE-D	Driver side air mix servo motor target pulse / Min.: 0, Max.: 255	Customized value displayed	-
AIR MIX PULSE-P	Passenger side air mix servo motor target pulse / Min.: 0, Max.: 255	Customized value displayed	-
AIR OUT PULSE	Air outlet servo motor target / Min.: 0, Max.: 255	Customized value displayed	-
A/I DAMP PLS	Air inlet damper target pulse / Min.: 0, Max.: 255	Customized value displayed	-
EVAP FIN TEMP	Evaporator temperature sensor / Min.: -29.7°C (-21.46°F) Max.: 59.6°C (139.28°F)	Actual evaporator temperature is displayed	Open circuit: -29.7°C (-21.46°F) Short circuit: 59.6°C (139.28°F)
REG PRESS SENS	Regulator pressure sensor / Min.: 0 MPaG Max.: 3.187 MPaG	Actual regulator pressure is displayed	-
REG CTRL CURRNT	Regulator control current / Min.: 0 A Max.: 0.997 A	Value changes between 0 A and 0.997 A in accordance with compressor and magnetic clutch operation	-
AIR INLET MODE	Air inlet mode / AUTO, MANUAL	Customized value displayed	-
COMPRESSOR MODE	Compressor mode / AUTO, MANUAL	Customized value displayed	-
COMPRS/DEF MODE	Compressor / DEF Mode / LINK, NORMAL	Customized value displayed	-
EVAP CTRL	Evaporator Control / AUTO, MANUAL	Customized value displayed	-
AUTO BLOW UP	Foot / DEF automatic blow up function / ON, OFF	Customized value displayed	-
FOOT/DEF MODE	Foot / DEF auto mode / ON, OFF	Customized value displayed	-
SET TEMP SHIFT	Shift set temperature / +2 C, +1 C, NORMAL, -1 C, -2 C	Customized value displayed	-
DESTINATION	Destination / DOMEST, USA, EUROPE, AUSTRAL, MIDEAST, NO INFO	Destinations displayed	-
#CODES	Number of trouble codes / Min.: 0, Max.: 255	Number of DTCs displayed	-

2. PERFORM ACTIVE TEST**HINT:**

Performing the intelligent tester's ACTIVE TEST allows relay, VSV, actuator and other items to be operated without removing any parts. Performing the ACTIVE TEST early in troubleshooting is one way to save time. The DATA LIST can be displayed in the ACTIVE TEST.

- (a) Connect the intelligent tester (with CAN VIM) to the DLC3.
- (b) Turn the ignition switch ON and turn the intelligent tester ON.
- (c) Perform the ACTIVE TEST by following the prompts on the tester.

Air conditioning amplifier

Item	Test Details / Display (Range)	Diagnostic Note
BLOWER MOTOR	Blower motor / Min.: 0, Max.: 31	-
A/C COMPRESSOR*1	A/C Compressor OFF, ON	-
A/C MAG CLUTCH*2	Magnetic clutch relay / OFF, ON	Operating sound can be heard
DEFOGGER RLY-R	Defogger relay (Rear) / OFF, ON	-
AIR MIX PULSE	Air mix servo motor pulse / Min.: 0, Max.: 255	-
AIR MIX PULSE-P	Air mix servo motor pulse (P side) / Min.: 0, Max.: 255	-
AIR OUT PULSE	Air outlet servo motor pulse / Min.: 0, Max.: 255	-
A/I DAMP PLS	Air inlet damper target pulse / Min.: 0, Max.: 255	-

HINT:

*1: for 2AZ-FE

*2: for 2GR-FE

DIAGNOSTIC TROUBLE CODE CHART

(2005/11-2006/01)

HINT:

When the air conditioning system functions properly, DTC B1400/00 is output.

Air conditioning system

DTC No.	Detection Item	Trouble Area	Memory	See page
B1411/11	Room Temperature Sensor Circuit	<ul style="list-style-type: none"> - Room temperature sensor - Harness and connector between room temperature sensor and air conditioning amplifier - Air conditioning amplifier 	Memorized (8.5 min. or more)	AC-43
B1412/12	Ambient Temperature Sensor Circuit	<ul style="list-style-type: none"> - Ambient temperature sensor - Harness and connector between ambient temperature sensor and combination meter assembly - Combination meter assembly - Air conditioning amplifier - CAN communication line 	Memorized (8.5 min. or more)	AC-46
B1413/13	Evaporator Temperature Sensor Circuit	<ul style="list-style-type: none"> - No. 1 cooler thermistor (Evaporator temperature sensor) - Harness and connector between No. 1 cooler thermistor (evaporator temperature sensor) and air conditioning amplifier - Air conditioning amplifier 	Memorized (8.5 min. or more)	AC-50
B1421/21	Solar Sensor Circuit (Passenger Side)	<ul style="list-style-type: none"> - Solar sensor - Harness and connector between solar sensor and air conditioning amplifier - Air conditioning amplifier 	Memorized (8.5 min. or more)	AC-53
B1423/23	Pressure Sensor Circuit	<ul style="list-style-type: none"> - Air conditioning pressure sensor - Harness and connector between Air conditioning pressure sensor and air conditioning amplifier - Air conditioning amplifier 	-	AC-59
B1424/24	Solar Sensor Circuit (Driver Side)	<ul style="list-style-type: none"> - Solar sensor - Harness and connector between solar sensor and air conditioning amplifier - Air conditioning amplifier 	Memorized (8.5 min. or more)	AC-64
B1441/41	Air Mix Damper Control Servo Motor Circuit (Passenger Side)	<ul style="list-style-type: none"> - Air mix control servo motor - Air conditioning harness - Air conditioning amplifier 	Memorized (30 sec.)	AC-67
B1442/42	Air Inlet Damper Control Servo Motor Circuit	<ul style="list-style-type: none"> - Air inlet control servo motor - Air conditioning harness - Air conditioning amplifier 	Memorized (30 sec.)	AC-69
B1443/43	Air Outlet Damper Control Servo Motor Circuit	<ul style="list-style-type: none"> - Air outlet control servo motor - Air conditioning harness - Air conditioning amplifier 	Memorized (30 sec.)	AC-71

DTC No.	Detection Item	Trouble Area	Memory	See page
B1446/46	Air Mix Damper Control Servo Motor Circuit (Driver Side)	<ul style="list-style-type: none">- Air mix control servo motor- Air conditioning harness- Air conditioning amplifier	Memorized (30 sec.)	AC-73
B1451/51	Compressor Solenoid Circuit	<ul style="list-style-type: none">- Compressor and pulley- Harness and connector between air conditioning amplifier and compressor and pulley- Air conditioning amplifier	-	AC-75
B1497/97	BUS IC Communication Malfunction	<ul style="list-style-type: none">- Air conditioning harness- Air conditioning amplifier	-	AC-83
B1499/99	Multiplex Communication Circuit	<ul style="list-style-type: none">- Air conditioning amplifier- Power source circuit- Air conditioning amplifier- ECM- Combination meter assembly- CAN communication line	-	AC-86

DIAGNOSTIC TROUBLE CODE CHART

(2006/01-)

HINT:

When the air conditioning system functions properly, DTC B1400/00 is output.

Air conditioning system

DTC No.	Detection Item	Trouble Area	Memory	See page
B1411/11	Room Temperature Sensor Circuit	<ul style="list-style-type: none"> - Room temperature sensor - Wire harness between room temperature sensor and air conditioning amplifier - Air conditioning amplifier 	Memorized (8.5 min. or more)	AC-43
B1412/12	Ambient Temperature Sensor Circuit	<ul style="list-style-type: none"> - Ambient temperature sensor - Wire harness between ambient temperature sensor and combination meter assembly - Combination meter assembly - Air conditioning amplifier - CAN communication line 	Memorized (8.5 min. or more)	AC-46
B1413/13	Evaporator Temperature Sensor Circuit	<ul style="list-style-type: none"> - No. 1 cooler thermistor (Evaporator temperature sensor) - Wire harness between No. 1 cooler thermistor (evaporator temperature sensor) and air conditioning amplifier - Air conditioning amplifier 	Memorized (8.5 min. or more)	AC-50
B1421/21	Solar Sensor Circuit (Passenger Side)	<ul style="list-style-type: none"> - Solar sensor - Wire harness between solar sensor and air conditioning amplifier - Air conditioning amplifier 	Memorized (8.5 min. or more)	AC-53
B1422/22*1	Compressor Lock Sensor Circuit	<ul style="list-style-type: none"> - Compressor and magnetic clutch - Compressor and magnetic clutch drive belt - Compressor lock sensor - Wire harness between compressor lock sensor and air conditioning amplifier - Air conditioning amplifier 	-	AC-56
B1423/23	Pressure Sensor Circuit	<ul style="list-style-type: none"> - Air conditioning pressure sensor - Wire harness between air conditioning pressure sensor and air conditioning amplifier - Air conditioning amplifier 	-	AC-59
B1424/24	Solar Sensor Circuit (Driver Side)	<ul style="list-style-type: none"> - Solar sensor - Wire harness between solar sensor and air conditioning amplifier - Air conditioning amplifier 	Memorized (8.5 min. or more)	AC-64
B1441/41	Air Mix Damper Control Servo Motor Circuit (Passenger Side)	<ul style="list-style-type: none"> - Air mix control servo motor - Air conditioning harness - Air conditioning amplifier 	Memorized (30 sec.)	AC-67

DTC No.	Detection Item	Trouble Area	Memory	See page
B1442/42	Air Inlet Damper Control Servo Motor Circuit	- Air inlet control servo motor - Air conditioning harness - Air conditioning amplifier	Memorized (30 sec.)	AC-69
B1443/43	Air Outlet Damper Control Servo Motor Circuit	- Air outlet control servo motor - Air conditioning harness - Air conditioning amplifier	Memorized (30 sec.)	AC-71
B1446/46	Air Mix Damper Control Servo Motor Circuit (Driver Side)	- Air mix control servo motor - Air conditioning harness - Air conditioning amplifier	Memorized (30 sec.)	AC-73
B1451/51	Compressor Solenoid Circuit	- A/C Compressor*2 - Wire harness between air conditioning amplifier and A/C compressor*2 - Air conditioning amplifier	-	AC-79
B1497/97	BUS IC Communication Malfunction	- Air conditioning harness - Air conditioning amplifier	-	AC-83
B1499/99	Multiplex Communication Circuit	- Air conditioning amplifier - ECM - Combination meter assembly - CAN communication line	-	AC-86

HINT:

*1: DTC B1422/22 (Compressor Lock Sensor Circuit) is indicated only for a currently occurring malfunction for 2GR-FE.

To confirm DTC B1422/22, perform the following steps:

1. With the ignition switch ON, enter the DTC check mode.
2. Press the R/F (Recirculation/Fresh) switch to enter actuator check mode, and set the operation to Step No. 3.
3. Press the AUTO switch to return to DTC check mode.
4. The DTC is displayed after approximately 3 seconds.

*2: Compressor and pulley for 2AZ-FE, compressor and magnetic clutch for 2GR-FE

DTC

B1411/11

Room Temperature Sensor Circuit

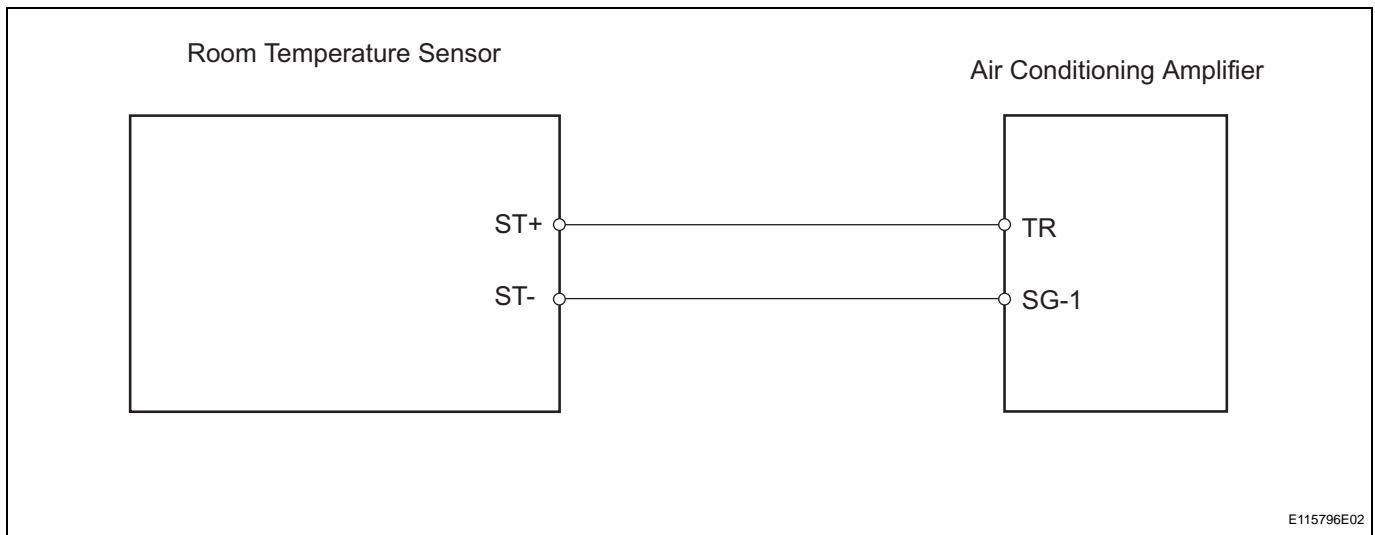
DESCRIPTION

The room temperature sensor is installed in the instrument panel to detect the room temperature and control the heater and air conditioner AUTO mode. The resistance of the room temperature sensor changes in accordance with the room temperature. As the temperature decreases, the resistance increases. As the temperature increases, the resistance decreases.

The air conditioning amplifier applies a voltage (5 V) to the room temperature sensor and reads voltage changes as changes in the resistance of the room temperature sensor.

DTC No.	DTC Detection Condition	Trouble Area
B1411/11	Open or short in room temperature sensor circuit	<ul style="list-style-type: none">Room temperature sensorHarness and connector between room temperature sensor and air conditioning amplifierAir conditioning amplifier

WIRING DIAGRAM



AC

INSPECTION PROCEDURE

1

READ VALUE OF INTELLIGENT TESTER (ROOM TEMP)

- Connect the intelligent tester (with CAN VIM) to the DLC3.
- Turn the ignition switch ON and turn the intelligent tester main switch ON.
- Select the item below in the DATA LIST, and read the value displayed on the intelligent tester.

Air conditioning amplifier

Item	Measurement Item / Display (Range)	Normal Condition	Diagnostic Note
ROOM TEMP	Room temperature sensor / Min.: -6.5°C (20.3°F) Max.: 57.25°C (135.05°F)	Actual room temperature is displayed	Open circuit: -6.5°C (20.3°F) Short circuit: 57.25°C (135.05°F)

OK:

The display is as specified in the normal condition column.

Result

Result	Proceed to
NG	A
OK (Checking from the PROBLEM SYMPTOMS TABLE)	B
OK (Checking from the DTC)	C

B

PROCEED TO NEXT CIRCUIT INSPECTION SHOWN IN PROBLEM SYMPTOMS TABLE

C

REPLACE AIR CONDITIONING AMPLIFIER ASSEMBLY

A**2****INSPECT COOLER THERMISTOR (ROOM TEMPERATURE SENSOR)**

(a) Remove the room temperature sensor.

(b) Measure the resistance of the sensor.

Standard resistance

Tester Connection	Condition	Specified Condition
1 (ST+) - 2 (ST-)	10°C (50°F)	3.00 to 3.73 kΩ
1 (ST+) - 2 (ST-)	15°C (59°F)	2.45 to 2.88 kΩ
1 (ST+) - 2 (ST-)	20°C (68°F)	1.95 to 2.30 kΩ
1 (ST+) - 2 (ST-)	25°C (77°F)	1.60 to 1.80 kΩ
1 (ST+) - 2 (ST-)	30°C (86°F)	1.28 to 1.47 kΩ
1 (ST+) - 2 (ST-)	35°C (95°F)	1.00 to 1.22 kΩ
1 (ST+) - 2 (ST-)	40°C (104°F)	0.80 to 1.00 kΩ
1 (ST+) - 2 (ST-)	45°C (113°F)	0.65 to 0.85 kΩ
1 (ST+) - 2 (ST-)	50°C (122°F)	0.50 to 0.70 kΩ
1 (ST+) - 2 (ST-)	55°C (131°F)	0.44 to 0.60 kΩ
1 (ST+) - 2 (ST-)	60°C (140°F)	0.36 to 0.50 kΩ

NOTICE:

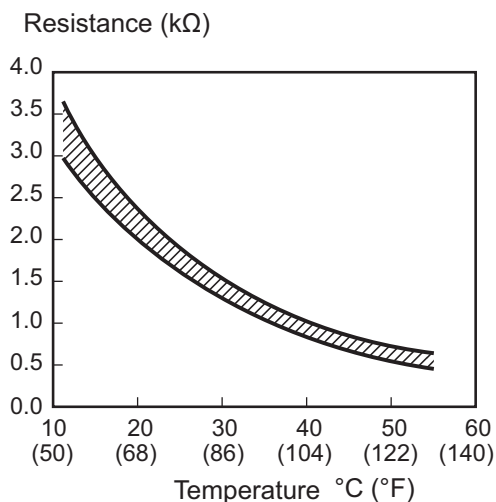
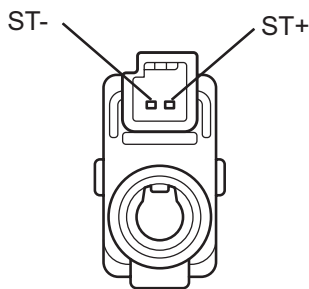
- Touching the sensor even slightly may change the resistance value. Be sure to hold the connector of the sensor.
- When measuring, the sensor temperature must be the same as the ambient temperature.

HINT:

As the temperature increases, the resistance decreases (see the graph).

NG

REPLACE COOLER THERMISTOR (ROOM TEMPERATURE SENSOR)



E117004E05

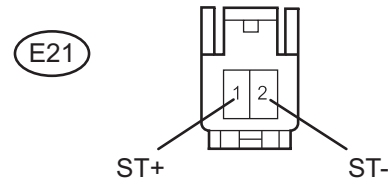
OK

3

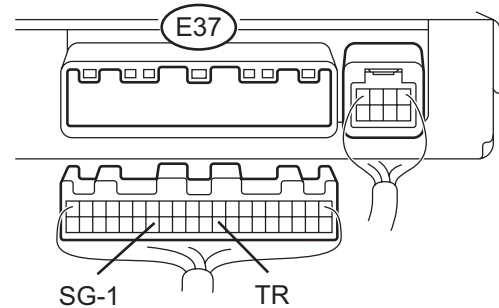
CHECK WIRE HARNESS (ROOM TEMPERATURE SENSOR - AIR CONDITIONING AMPLIFIER)

Wire Harness Side

Room Temperature Sensor



Air Conditioning Amplifier



E115797E03

- (a) Disconnect the E21 sensor connector.
- (b) Disconnect the E37 amplifier connector.
- (c) Measure the resistance of the wire harness side connectors.

Standard resistance

Tester Connection	Specified Condition
E21-1 (ST+) - E37-29 (TR)	Below 1 Ω
E21-2 (ST-) - E37-34 (SG-1)	Below 1 Ω
E21-1 (ST+) - Body ground	1 M Ω or higher
E21-2 (ST-) - Body ground	1 M Ω or higher

NG

REPAIR OR REPLACE HARNESS AND CONNECTOR

OK

AC

REPLACE AIR CONDITIONING AMPLIFIER ASSEMBLY

DTC

B1412/12

Ambient Temperature Sensor Circuit

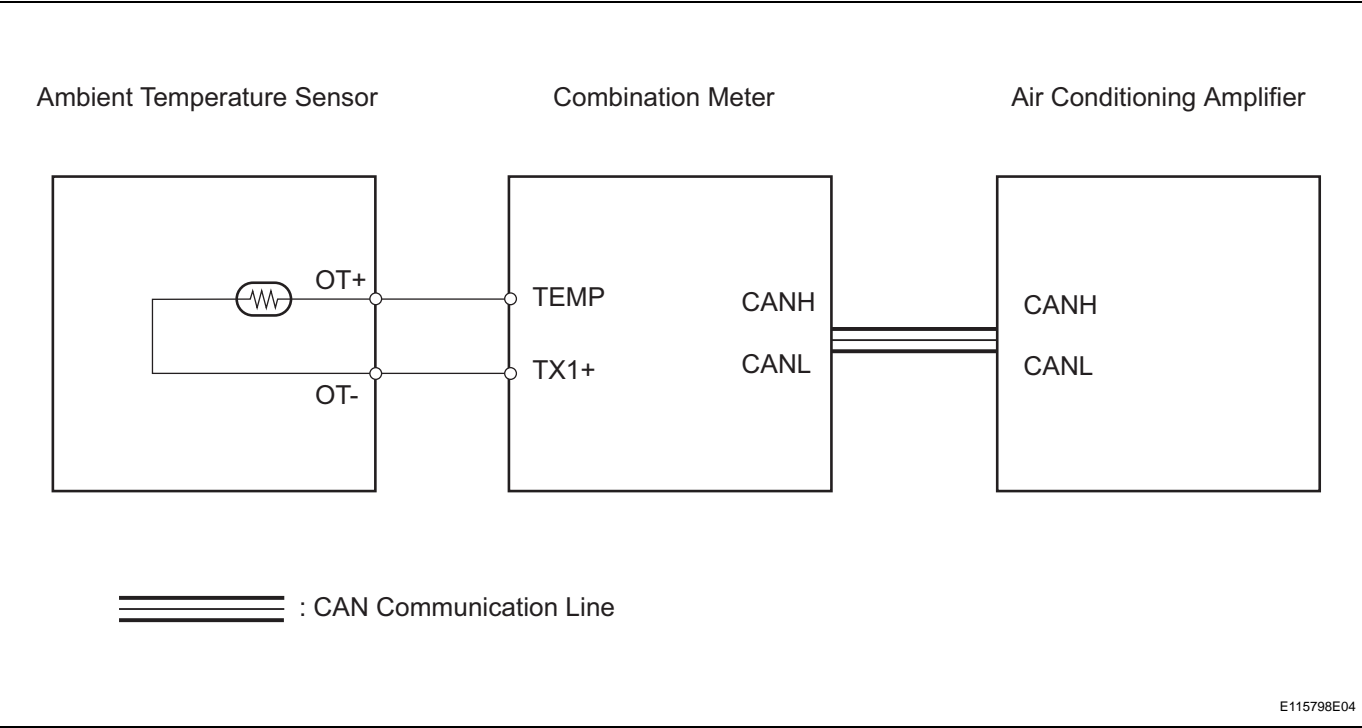
DESCRIPTION

The ambient temperature sensor is installed in the front part of the condenser to detect the ambient temperature and control the air conditioner. The sensor is connected to the combination meter and detects fluctuations in the ambient temperature. This data is used for controlling the room temperature. The sensor sends a signal to the air conditioning amplifier via the combination meter. The resistance of the ambient temperature sensor changes in accordance with the ambient temperature. As the temperature decreases, the resistance increases. As the temperature increases, the resistance decreases.

The air conditioning amplifier applies a voltage (5 V) to the ambient temperature sensor and reads voltage changes as changes in the resistance of the ambient temperature sensor. The combination meter sends the read signal to the air conditioning amplifier via CAN communication.

DTC No.	DTC Detection Condition	Trouble Area
B1412/12	Open or short in ambient temperature sensor circuit	<ul style="list-style-type: none">Ambient temperature sensorHarness and connector between ambient temperature sensor and combination meter assemblyCombination meterAir conditioning amplifierCAN communication line

WIRING DIAGRAM



INSPECTION PROCEDURE

1

READ VALUE OF INTELLIGENT TESTER (AMBI TEMP SENS)

- (a) Connect the intelligent tester (with CAN VIM) to the DLC3.

- (b) Turn the ignition switch ON and turn the intelligent tester main switch ON.
- (c) Select the item below in the DATA LIST, and read the value displayed on the intelligent tester.

Air conditioning amplifier

Item	Measurement Item / Display (Range)	Normal Condition	Diagnostic Note
AMBI TEMP SENS	Ambient temperature sensor / Min.: -23.3°C (-9.94°F) Max.: 65.95°C (150.71°F)	Actual ambient temperature is displayed	Open circuit: -23.3°C (-9.94°F) Short circuit: 65.95°C (150.71°F)

OK:

The display is as specified in the normal condition column.

Result

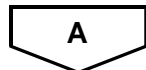
Result	Proceed to
NG	A
OK (Checking from the PROBLEM SYMPTOMS TABLE)	B
OK (Checking from the DTC)	C



PROCEED TO NEXT CIRCUIT INSPECTION SHOWN IN PROBLEM SYMPTOMS TABLE

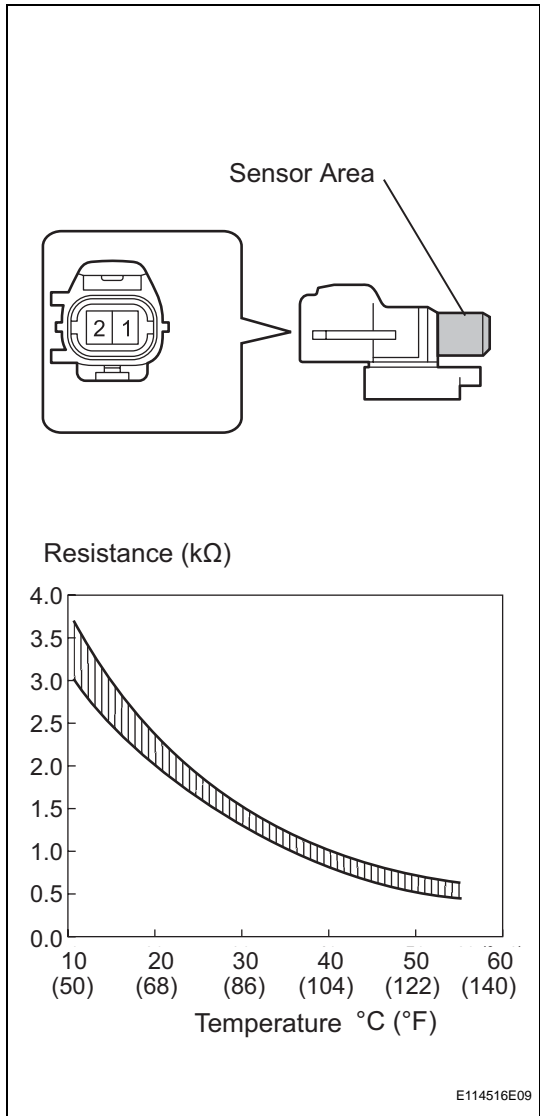


REPLACE AIR CONDITIONING AMPLIFIER



2

INSPECT AMBIENT TEMPERATURE SENSOR



- (a) Remove the ambient temperature sensor.
(b) Measure the resistance of the sensor.

Standard resistance

Tester Connection	Condition	Specified Condition
1 - 2	10°C (50°F)	3.00 to 3.73 kΩ
1 - 2	15°C (50°F)	2.45 to 2.88 kΩ
1 - 2	20°C (68°F)	1.95 to 2.30 kΩ
1 - 2	25°C (77°F)	1.60 to 1.80 kΩ
1 - 2	30°C (86°F)	1.28 to 1.47 kΩ
1 - 2	35°C (95°F)	1.00 to 1.22 kΩ
1 - 2	40°C (104°F)	0.80 to 1.00 kΩ
1 - 2	45°C (113°F)	0.65 to 0.85 kΩ
1 - 2	50°C (122°F)	0.50 to 0.70 kΩ
1 - 2	55°C (131°F)	0.44 to 0.60 kΩ
1 - 2	60°C (140°F)	0.36 to 0.50 kΩ

NOTICE:

- Touching the sensor even slightly may change the resistance value. Be sure to hold the connector of the sensor.
- When measuring, the sensor temperature must be the same as the ambient temperature.

HINT:

As the temperature increases, the resistance decreases (see the graph).

NG

REPLACE AMBIENT TEMPERATURE SENSOR

OK

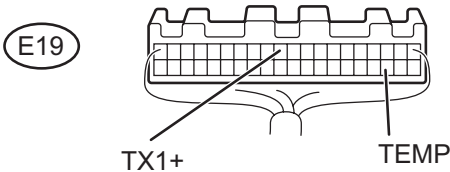
3 CHECK WIRE HARNESS (AMBIENT TEMPERATURE SENSOR - COMBINATION METER)

Wire Harness Side

Ambient Temperature Sensor



Combination Meter



E123520E01

- (a) Disconnect the A17 sensor connector.
- (b) Disconnect the E19 meter connector.
- (c) Measure the resistance of the wire harness side connectors.

Standard resistance

Tester Connection	Specified Condition
A17-2 (OT+) - E19-23 (TEMP)	Below 1 Ω
A17-1 (OT-) - E19-11 (TX1+)	Below 1 Ω
A17-2 (OT+) - Body ground	1 M Ω or higher
A17-1 (OT-) - Body ground	1 M Ω or higher

NG

REPAIR OR REPLACE HARNESS AND CONNECTOR

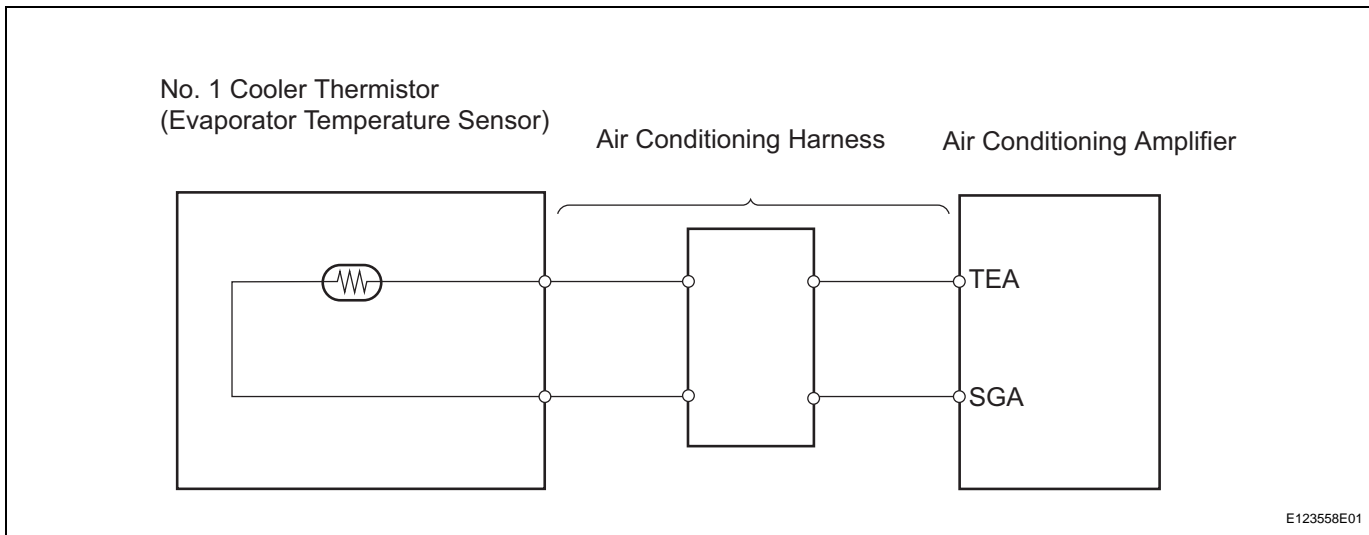
OK

REPLACE COMBINATION METER

DTC**B1413/13****Evaporator Temperature Sensor Circuit****DESCRIPTION**

The No. 1 cooler thermistor (evaporator temperature sensor) is installed on the evaporator in the air conditioning unit to detect the temperature of the cooled air that has passed through the evaporator and to control the air conditioner. It sends signals to the air conditioning amplifier. The signals change in accordance with the resistance of the No. 1 cooler thermistor (evaporator temperature sensor). As the temperature decreases, the resistance increases. As the temperature increases, the resistance decreases. The air conditioning amplifier applies a voltage (5 V) to the No. 1 cooler thermistor (evaporator temperature sensor) and reads voltage changes as changes in the resistance of the No. 1 cooler thermistor (evaporator temperature sensor). This sensor is used for frost prevention.

DTC No.	DTC Detection Condition	Trouble Area
B1413/13	Open or short in evaporator temperature sensor circuit	<ul style="list-style-type: none">No. 1 cooler thermistor (evaporator temperature sensor)Harness and connector between No. 1 cooler thermistor (evaporator temperature sensor) and air conditioning amplifierAir conditioning amplifier

WIRING DIAGRAM**INSPECTION PROCEDURE****1****READ VALUE OF INTELLIGENT TESTER (EVAP FIN TEMP)**

- Connect the intelligent tester (with CAN VIM) to the DLC3.
- Turn the ignition switch ON and turn the intelligent tester main switch ON.
- Select the item below in the DATA LIST, and read the value displayed on the intelligent tester.

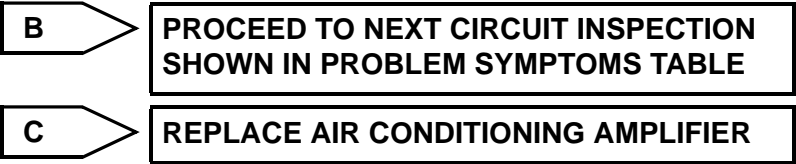
Air conditioning amplifier

Item	Measurement Item / Display (Range)	Normal Condition	Diagnostic Note
EVAP FIN TEMP	Evaporator temperature sensor / Min.: -29.7°C (-21.46°F) / Max.: 59.6°C (139.28°F)	Actual evaporator temperature is displayed	Open circuit: -29.7°C (-21.46°F) Short circuit: 59.6°C (139.28°F)

OK:
The display is as specified in the normal condition column.

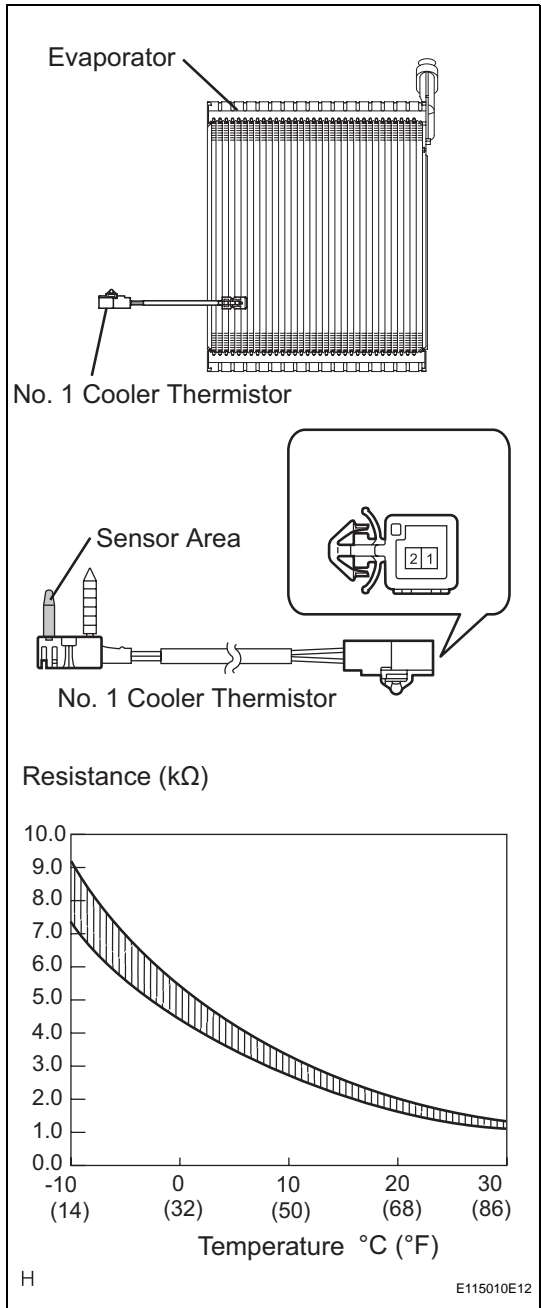
Result

Result	Proceed to
NG	A
OK (Checking from the PROBLEM SYMPTOMS TABLE)	B
OK (Checking from the DTC)	C



2

INSPECT NO. 1 COOLER THERMISTOR (EVAPORATOR TEMPERATURE SENSOR)



- (a) Remove the No. 1 cooler thermistor.
(b) Measure the resistance of the thermistor.

Standard resistance

Tester Connection	Condition	Specified Condition
1 - 2	-10°C (14°F)	7.30 to 9.10 kΩ
1 - 2	-5°C (23°F)	5.65 to 6.95 kΩ
1 - 2	0°C (32°F)	4.40 to 5.35 kΩ
1 - 2	5°C (41°F)	3.40 to 4.15 kΩ
1 - 2	10°C (50°F)	2.70 to 3.25 kΩ
1 - 2	15°C (59°F)	2.14 to 2.58 kΩ
1 - 2	20°C (68°F)	1.71 to 2.05 kΩ
1 - 2	25°C (77°F)	1.38 to 1.64 kΩ
1 - 2	30°C (86°F)	1.11 to 1.32 kΩ

NOTICE:

- Touching the thermistor even slightly may change the resistance value. Be sure to hold the connector of the thermistor.
- When measuring, the thermistor temperature must be the same as the ambient temperature.

HINT:

As the temperature increases, the resistance decreases (see the graph).

NG

REPLACE NO. 1 COOLER THERMISTOR

OK

REPLACE AIR CONDITIONING HARNESS ASSEMBLY

DTC

B1421/21

Solar Sensor Circuit (Passenger Side)

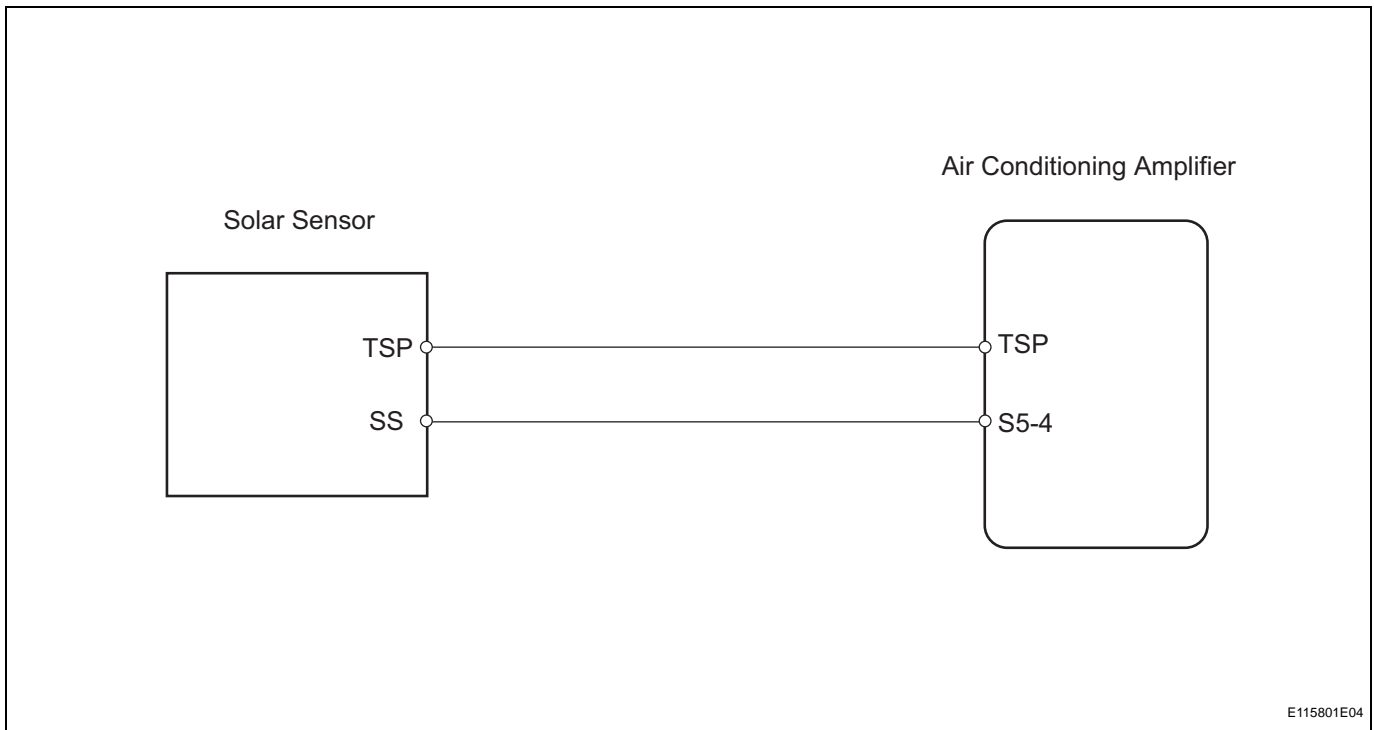
DESCRIPTION

The solar sensor, which is installed on the upper side of the instrument panel, detects sunlight and controls the air conditioning AUTO mode. The output voltage from the solar sensor varies in accordance with the amount of sunlight. When the sunlight increases, the output voltage increases. As the sunlight decreases, the output voltage decreases.

The air conditioning amplifier detects changes in the output voltage from the solar sensor.

DTC No.	DTC Detection Condition	Trouble Area
B1421/21	Open or short in passenger side solar sensor circuit	<ul style="list-style-type: none"> Solar sensor Harness and connector between solar sensor and air conditioning amplifier Air conditioning amplifier

WIRING DIAGRAM



AC

INSPECTION PROCEDURE

1

READ VALUE OF INTELLIGENT TESTER (SOLAR SENS-P)

- Connect the intelligent tester (with CAN VIM) to the DLC3.
- Turn the ignition switch ON and turn the intelligent tester main switch ON.
- Select the item below in the DATA LIST, and read the value displayed on the intelligent tester.

Air conditioning amplifier

Item	Measurement Item / Display (Range)	Normal Condition	Diagnostic Note
SOLAR SENS-P	Passenger side solar sensor / Min.: 0, Max.: 255	Passenger side temperature increases as brightness increases	-

OK:

The display is as specified in the normal condition column.

Result

Result	Proceed to
NG	A
OK (Checking from the PROBLEM SYMPTOMS TABLE)	B
OK (Checking from the DTC)	C

B

PROCEED TO NEXT CIRCUIT INSPECTION SHOWN IN PROBLEM SYMPTOMS TABLE

C

REPLACE AIR CONDITIONING AMPLIFIER

A

2

INSPECT COOLER (SOLAR SENSOR) THERMISTOR

- Remove the solar sensor.
- Measure the resistance of the sensor.
- Connect the ohmmeter's positive (+) lead to terminal 1 and the negative (-) lead to terminal 2 of the solar sensor.

Standard resistance

Tester Connection	Condition	Specified Condition
1 (SS) - 2 (TSP)	Sensor exposed to electric light	Except $\infty \Omega$
1 (SS) - 2 (TSP)	Sensor covered with cloth	$\infty \Omega$ (No continuity)

NOTICE:

The connection procedure for using a digital tester such as an electrical tester is shown above. When using an analog tester, connect the positive (+) lead to terminal 2 and the negative (-) lead to terminal 1 of the solar sensor.

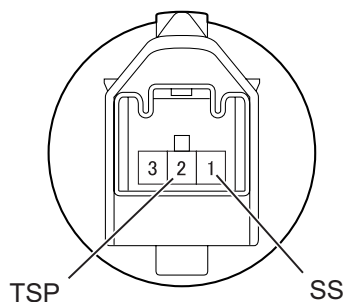
HINT:

- As the inspection light is moved away from the sensor, the voltage decreases.
- Use an incandescent light for the inspection. Position it about 30 cm (11.8 in.) from the solar sensor.

NG

REPLACE COOLER (SOLAR SENSOR) THERMISTOR

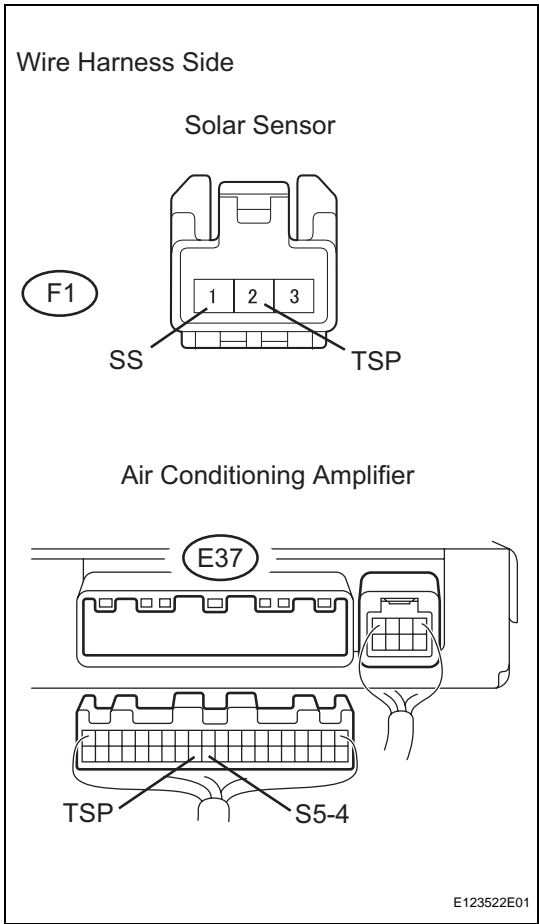
OK



G

E123521E01

3 CHECK WIRE HARNESS (SOLAR SENSOR - AIR CONDITIONING AMPLIFIER)



- (a) Disconnect the F1 sensor connector.
- (b) Disconnect the E37 amplifier connector.
- (c) Measure the resistance of the wire harness side connectors.

Standard resistance

Tester Connection	Specified Condition
E37-32 (TSP) - F1-2 (TSP)	Below 1 Ω
E37-31 (S5-4) - F1-1 (SS)	Below 1 Ω
E37-32 (TSP) - Body ground	1 M Ω or higher
E37-31 (S5-4) - Body ground	1 M Ω or higher

NG

REPAIR OR REPLACE HARNESS AND CONNECTOR

OK

AC

REPLACE AIR CONDITIONING AMPLIFIER

DTC

B1422/22

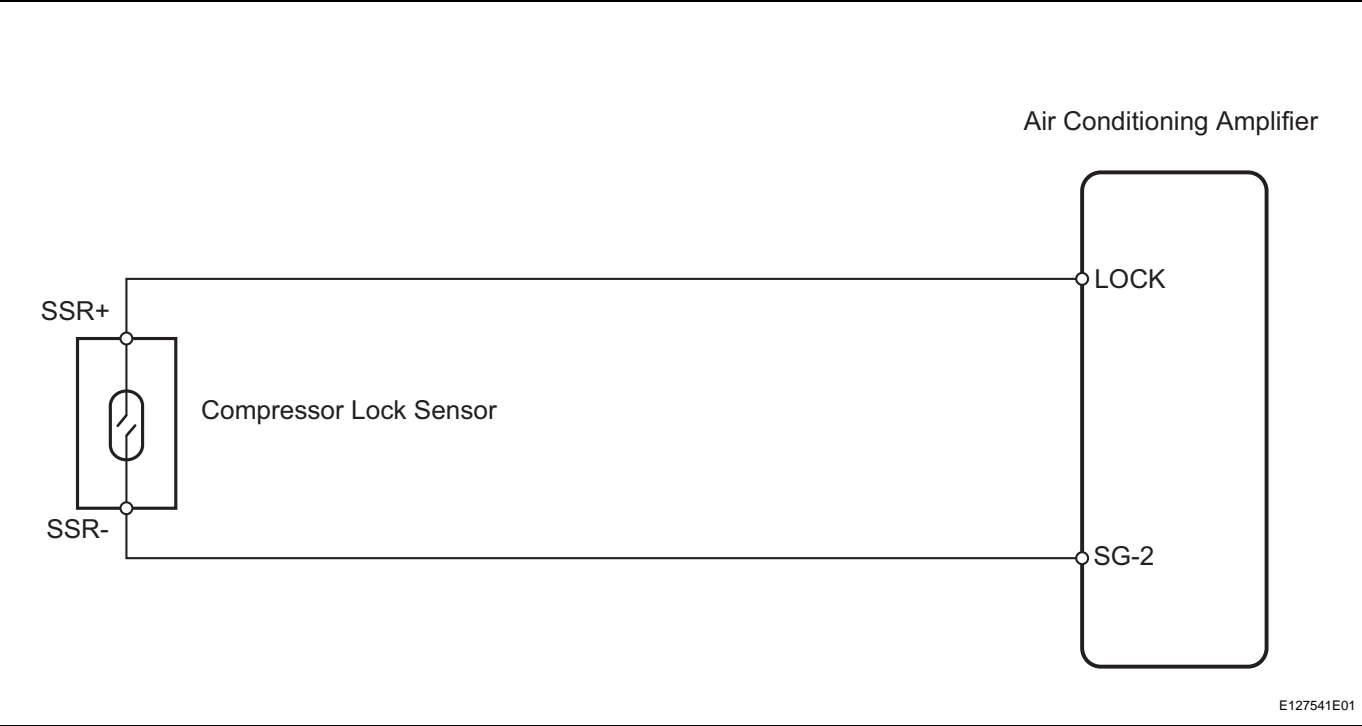
Compressor Lock Sensor Circuit

DESCRIPTION

This sensor sends 1 pulse per engine revolution to the air conditioning amplifier. If the ratio of the compressor speed divided by the engine speed is smaller than a predetermined value, the air conditioning amplifier turns the compressor off, and the indicator blinks at approximately 1 second intervals.

DTC No.	DTC Detection Condition	Trouble Area
B1422/22	Open or short in compressor lock sensor circuit All conditions below are detected for 3 seconds or more: 1. Engine speed: 450 rpm or more 2. Ratio between engine and compressor speed deviates 20% or more in comparison to normal operation	<ul style="list-style-type: none">Compressor and magnetic clutchCompressor and magnetic clutch drive beltCompressor lock sensorWire harness between compressor lock sensor and air conditioning amplifierAir conditioning amplifier

WIRING DIAGRAM

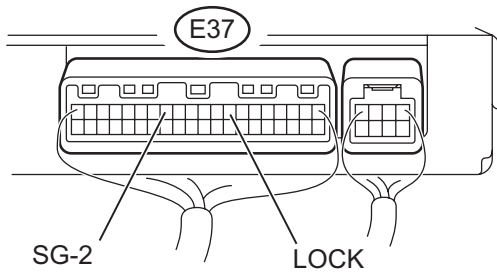


INSPECTION PROCEDURE

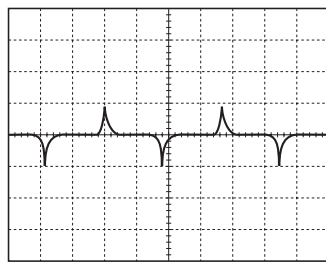
1 CHECK AIR CONDITIONING AMPLIFIER (LOCK SIGNAL)

Wire Harness Side

Air Conditioning Amplifier



Waveform



500 mV/DIV.

← GND

20 msec./DIV.

E127542E01

(a) Remove the air conditioning amplifier with its connectors still connected.

(b) Check the waveform of the amplifier connector.

OK:

Waveform is as shown in the illustration.

Item	Content
Tester Connection	LOCK (E37-8) - SG-2 (E37-13)
Tool Setting	500 mV/DIV., 20 msec./DIV.
Condition	Ignition switch ON AUTO switch ON A/C switch ON Magnetic clutch ON

Result

Result	Proceed to
NG	A
OK (Checking from the PROBLEM SYMPTOMS TABLE)	B
OK (Checking from the DTC)	C

B

PROCEED TO NEXT CIRCUIT INSPECTION SHOWN IN PROBLEM SYMPTOMS TABLE

C

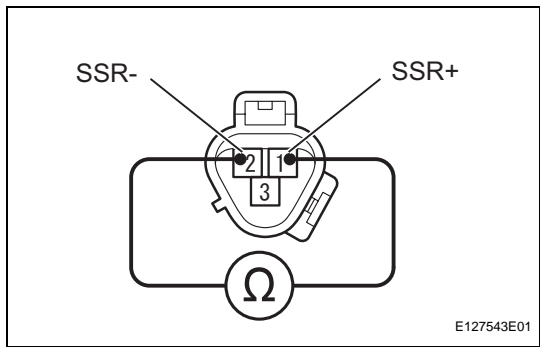
REPLACE AIR CONDITIONING AMPLIFIER

A

AC

2

INSPECT COMPRESSOR LOCK SENSOR



- (a) Disconnect the B47 compressor lock sensor connector.
(b) Measure the resistance of the sensor.

Standard resistance

Tester Connection	Condition	Specified Condition
1 (SSR+) - 2 (SSR-)	20°C (68°F)	65 to 125 Ω

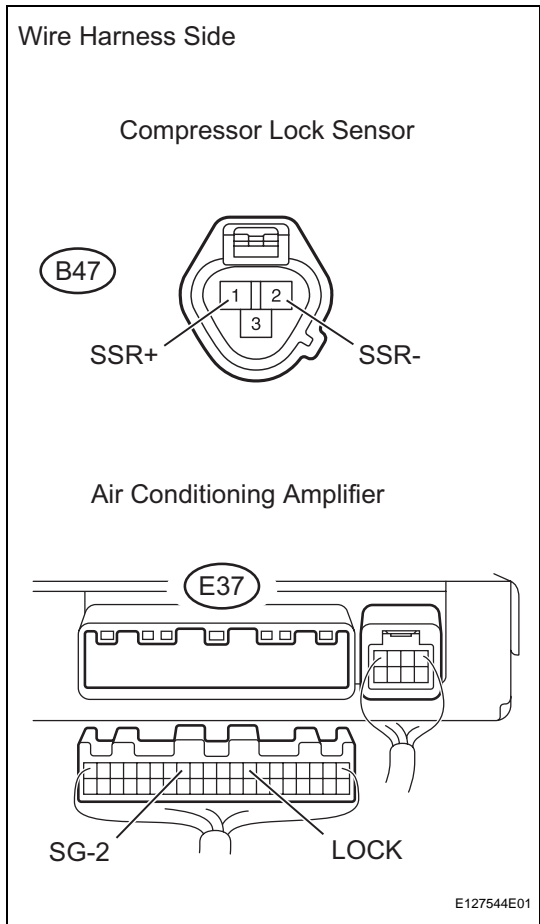
NG

REPLACE COMPRESSOR LOCK SENSOR

OK

3

CHECK WIRE HARNESS (COMPRESSOR LOCK SENSOR - AIR CONDITIONING AMPLIFIER)



- (a) Disconnect the B47 compressor lock sensor connector.
(b) Disconnect the E37 amplifier connector.
(c) Measure the resistance of the wire harness side connectors.

Standard resistance

Tester Connection	Specified Condition
B47-1 (SSR+) - E37-8 (LOCK)	Below 1 Ω
B47-2 (SSR-) - E37-13 (SG-2)	Below 1 Ω
B47-1 (SSR+) - E37-13 (SG-2)	10 kΩ or higher
E37-8 (LOCK) - Body ground	10 kΩ or higher

NG

REPAIR OR REPLACE HARNESS AND CONNECTOR

OK

REPLACE AIR CONDITIONING AMPLIFIER

DTC

B1423/23

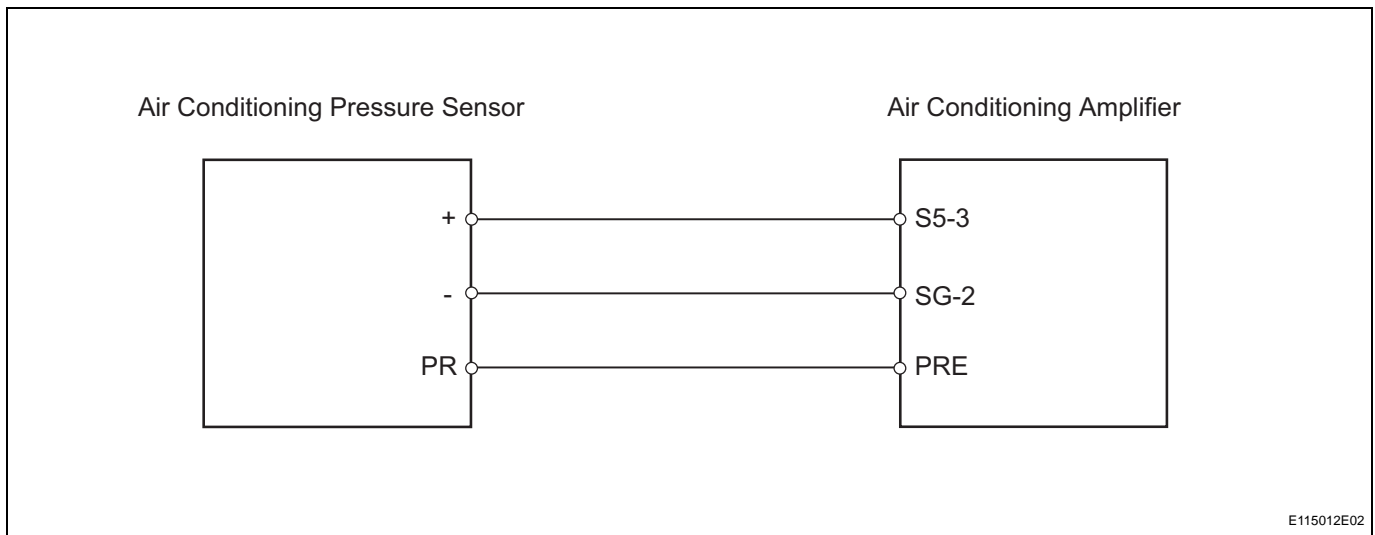
Pressure Sensor Circuit

DESCRIPTION

This DTC is output when the refrigerant pressure is either extremely low (0.19 MPa [2.0 kgf/cm², 28 psi] or less) or extremely high (3.14 MPa [32.0 kgf/cm², 455 psi] or more). The air conditioning pressure sensor, which is installed on the pipe of the high pressure side, detects the refrigerant pressure and sends refrigerant pressure signals to the air conditioning amplifier. The air conditioning amplifier determines the pressure from the signals in accordance with the sensor characteristics, and controls the compressor accordingly.

DTC No.	DTC Detection Condition	Trouble Area
B1423/23	Open or short in air conditioning pressure sensor circuit	<ul style="list-style-type: none"> Air conditioning pressure sensor Harness and connector between air conditioning pressure sensor and air conditioning amplifier Air conditioning amplifier

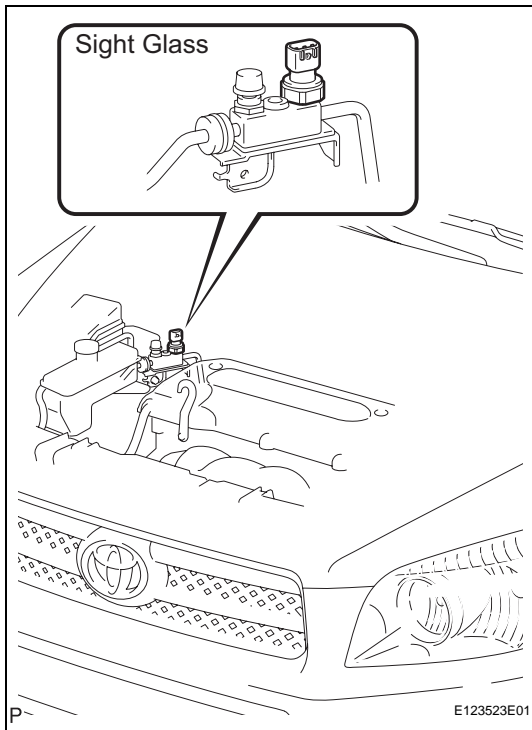
WIRING DIAGRAM



INSPECTION PROCEDURE

1

CHECK REFRIGERANT



(a) Check the sight glass of the cooler unit refrigerant liquid pipe.

(1) Prepare the vehicle in accordance with the chart below.

Item	Condition
Engine Speed	1,500 rpm
Vehicle Doors	Fully open
Temperature Setting	MAX COLD
Blower Speed	HI
A/C Switch	ON

(2) Compare the sight glass to the following chart.

Item	Symptom	Amount of Refrigerant	Corrective Procedures
1	Bubbles visible	Insufficient*	1. Check for gas leakage and repair if necessary 2. Add refrigerant until bubbles disappear
2	No bubbles visible	Empty, insufficient or too much	Refer to items 3 and 4
3	No temperature difference between compressor inlet and outlet	Empty or nearly empty	1. Check for gas leakage with gas leak detector and repair if necessary 2. Add refrigerant until bubbles disappear
4	Considerable temperature difference between compressor inlet and outlet	Correct or too much	Refer to items 5 and 6
5	Refrigerant becomes clear immediately after A/C turned OFF	Too much	1. Drain or discharge refrigerant 2. Bleed air and supply proper amount of purified refrigerant
6	Refrigerant foams and then becomes clear immediately after A/C turned OFF	Correct	-

HINT:

*: If the ambient temperature is higher than usual but cooling is sufficient, bubbles in the sight glass are permissible.

NG

CHARGE REFRIGERANT

OK

2 READ VALUE OF INTELLIGENT TESTER (REG PRESS SENS)

- Connect the intelligent tester (with CAN VIM) to the DLC3.
- Turn the ignition switch ON and turn the intelligent tester main switch ON.
- Select the item below in the DATA LIST, and read the value displayed on the intelligent tester.

Air conditioning amplifier

Item	Measurement Item / Display (Range)	Normal Condition	Diagnostic Note
REG PRESS SENS	Regulator pressure sensor / Min.: 0 MPaG Max.: 3.187 MPaG	Actual regulator pressure is displayed	-

OK:

The display is as specified in the normal condition column.

Result

Result	Proceed to
NG	A
OK (Checking from the PROBLEM SYMPTOMS TABLE)	B
OK (Checking from the DTC)	C

B

PROCEED TO NEXT CIRCUIT INSPECTION SHOWN IN PROBLEM SYMPTOMS TABLE

C

REPLACE AIR CONDITIONING AMPLIFIER

A

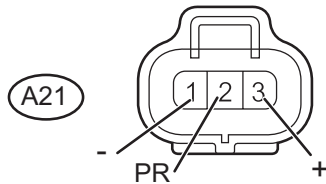
AC

3

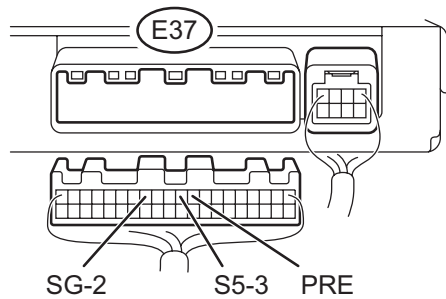
CHECK WIRE HARNESS (PRESSURE SENSOR - AIR CONDITIONING AMPLIFIER)

Wire Harness Side

Air Conditioning Pressure Sensor



Air Conditioning Amplifier



E115804E09

- Disconnect the A21 pressure sensor connector.
- Disconnect the E37 amplifier connector.
- Measure the resistance of the wire harness side connectors.

Standard resistance

Tester Connection	Specified Condition
A21-3 (+) - E37-10 (S5-3)	Below 1 Ω
A21-2 (PR) - E37-9 (PRE)	Below 1 Ω
A21-1 (-) - E37-13 (SG-2)	Below 1 Ω
A21-3 (+) - Body ground	1 M Ω or higher
A21-2 (PR) - Body ground	1 M Ω or higher
A21-1 (-) - Body ground	1 M Ω or higher

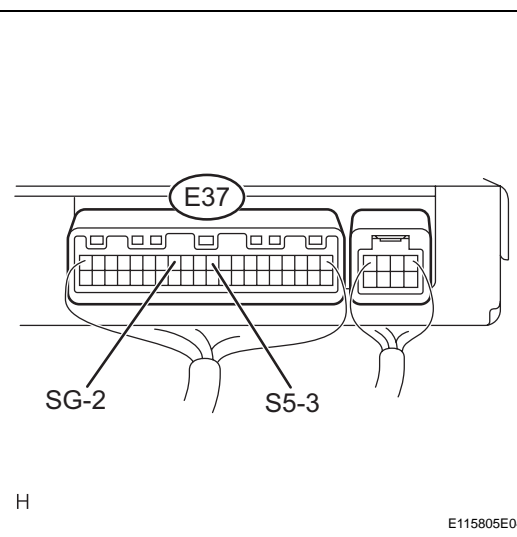
NG

REPAIR OR REPLACE HARNESS AND CONNECTOR

OK

4

CHECK AIR CONDITIONING AMPLIFIER



H

E115805E04

- Remove the air conditioning amplifier with its connectors still connected.
- Measure the resistance of the wire harness side connector.

Standard resistance

Tester Connection	Specified Condition
E37-13 (SG-2) - Body ground	Below 1 Ω

- Turn the ignition switch ON.
- Measure the voltage of the wire harness side connector.

Standard voltage

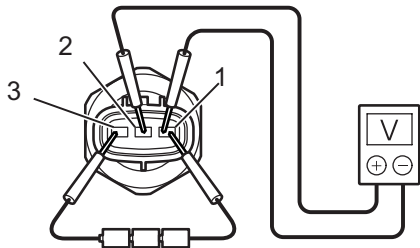
Tester Connection	Specified Condition
E37-10 (S5-3) - E37-13 (SG-2)	4.5 to 5.5 V

NG

REPLACE AIR CONDITIONING AMPLIFIER

OK

5 INSPECT AIR CONDITIONING PRESSURE SENSOR



- Turn the A/C switch ON.
- Disconnect the A21 sensor connector.
- Connect the three 1.5 V dry cell batteries' positive (+) lead to terminal 3 and the negative (-) lead to terminal 1. Then connect the voltmeter's positive (+) lead to terminal 2 and the negative (-) lead to terminal 1. Measure the voltage.

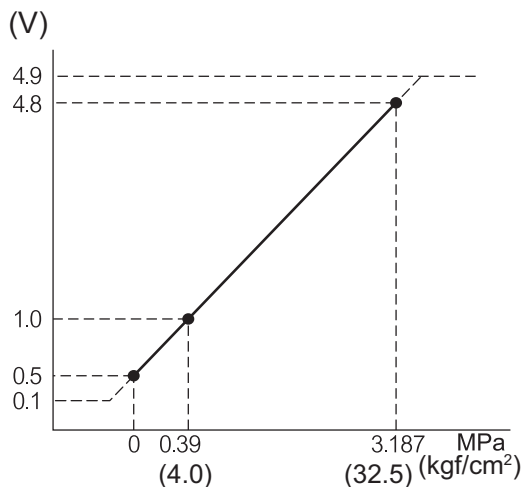
OK:

The voltage changes in accordance with the refrigerant pressure as shown in the graph.

NG

REPLACE AIR CONDITIONING PRESSURE SENSOR

AC



E115949E03

OK

REPLACE AIR CONDITIONING AMPLIFIER

DTC

B1424/24

Solar Sensor Circuit (Driver Side)

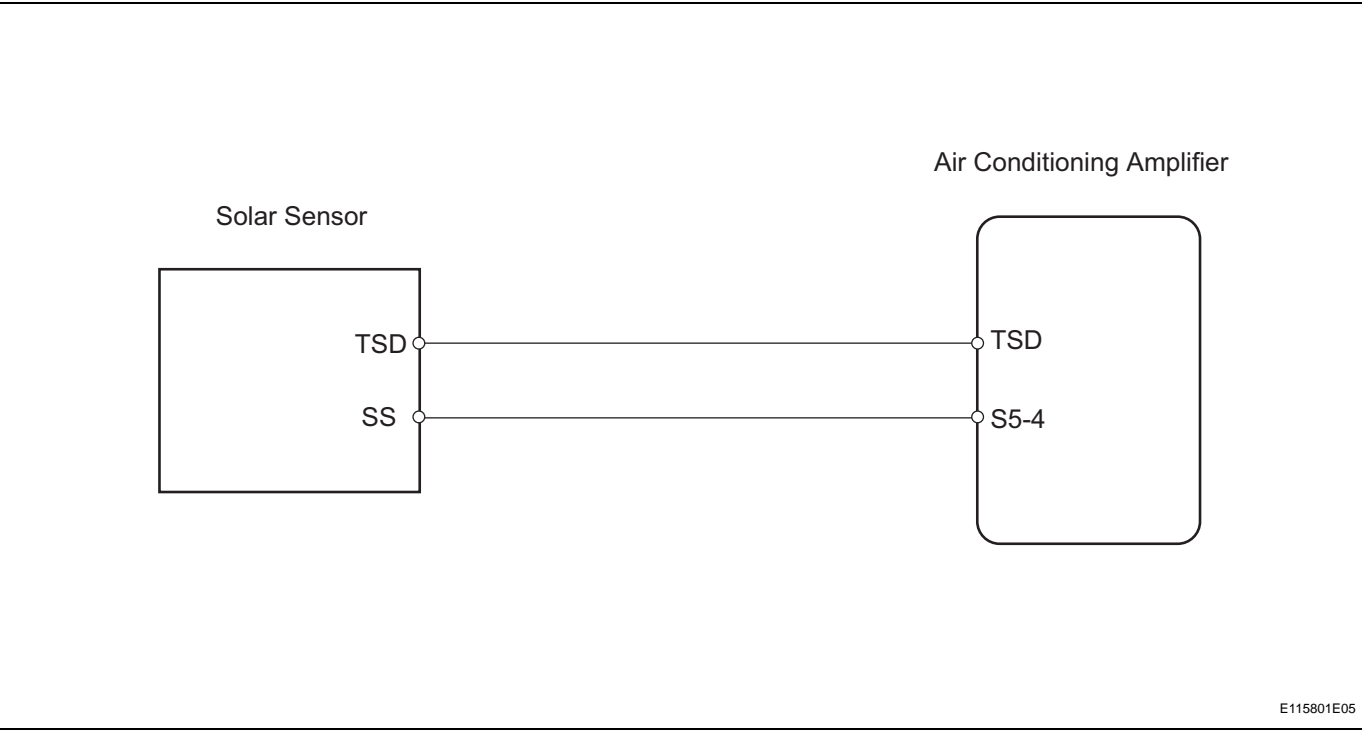
DESCRIPTION

The solar sensor, which is installed on the upper side of the instrument panel, detects sunlight and controls the air conditioning AUTO mode. The output voltage from the solar sensor varies in accordance with the amount of sunlight. When the sunlight increases, the output voltage increases. As the sunlight decreases, the output voltage decreases.

The air conditioning amplifier detects changes in the output voltage from the solar sensor.

DTC No.	DTC Detection Condition	Trouble Area
B1424/24	Open or short in passenger side solar sensor circuit	<ul style="list-style-type: none">Solar sensorHarness and connector between solar sensor and air conditioning amplifierAir conditioning amplifier

WIRING DIAGRAM



INSPECTION PROCEDURE

1

READ VALUE OF INTELLIGENT TESTER (SOLAR SENSOR D SIDE)

- (a) Connect the intelligent tester (with CAN VIM) to the DLC3.
- (b) Turn the ignition switch ON and turn the intelligent tester main switch ON.
- (c) Select the item below in the DATA LIST, and read the value displayed on the intelligent tester.

Air conditioning amplifier

Item	Measurement Item / Display (Range)	Normal Condition	Diagnostic Note
SOLAR SENS-D	Driver side solar sensor / Min.: 0, Max.: 255	Driver side temperature increases as brightness increases	-

OK:

The display is as specified in the normal condition column.

Result

Result	Proceed to
NG	A
OK (Checking from the PROBLEM SYMPTOMS TABLE)	B
OK (Checking from the DTC)	C

B

PROCEED TO NEXT CIRCUIT INSPECTION SHOWN IN PROBLEM SYMPTOMS TABLE

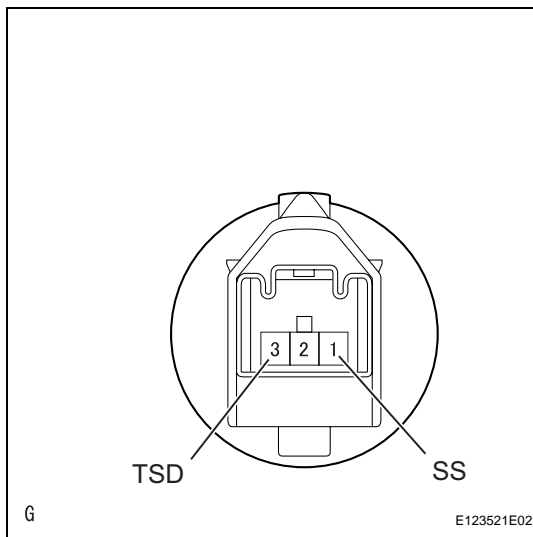
C

REPLACE AIR CONDITIONING AMPLIFIER

A

2

INSPECT SOLAR SENSOR



- Remove the solar sensor.
- Measure the resistance of the sensor.
- Connect the ohmmeter's positive (+) lead to terminal 1 and the negative (-) lead to terminal 3 of the solar sensor.

Standard resistance

Tester Connection	Condition	Specified Condition
1 (SS) - 3 (TSD)	Sensor exposed to electric light	Except $\infty \Omega$
1 (SS) - 3 (TSD)	Sensor covered with cloth	$\infty \Omega$ (No continuity)

NOTICE:

The connection procedure for using a digital tester such as an electrical tester is shown above. When using an analog tester, connect the positive (+) lead to terminal 3 and the negative (-) lead to terminal 1 of the solar sensor.

HINT:

- As the inspection light is moved away from the sensor, the voltage decreases.
- Use an incandescent light for the inspection. Position it about 30 cm (11.8 in.) from the solar sensor.

NG

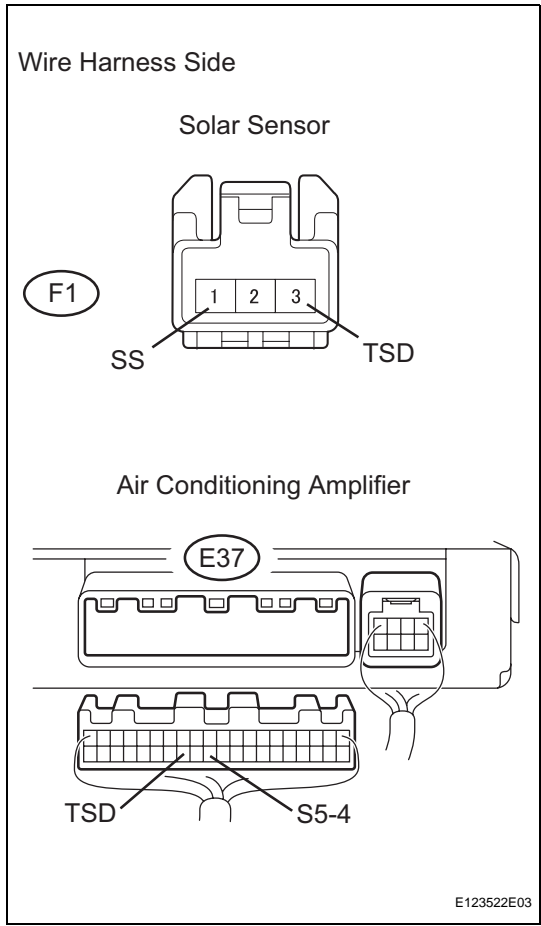
REPLACE SOLAR SENSOR

OK

AC

3

CHECK WIRE HARNESS (SOLAR SENSOR - AIR CONDITIONING AMPLIFIER)



- (a) Disconnect the F1 sensor connector.
- (b) Disconnect the E37 amplifier connector.
- (c) Measure the resistance of the wire harness side connectors.

Standard resistance

Tester Connection	Specified Condition
E37-33 (TSD) - F1-3 (TSD)	Below 1 Ω
E37-31 (S5-4) - F1-1 (SS)	Below 1 Ω
E37-33 (TSD) - Body ground	1 MΩ or higher
E37-31 (S5-4) - Body ground	1 MΩ or higher

NG

REPAIR OR REPLACE HARNESS AND CONNECTOR

OK

REPLACE AIR CONDITIONING AMPLIFIER

DTC	B1441/41	Air Mix Damper Control Servo Motor Circuit (Passenger Side)
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DESCRIPTION

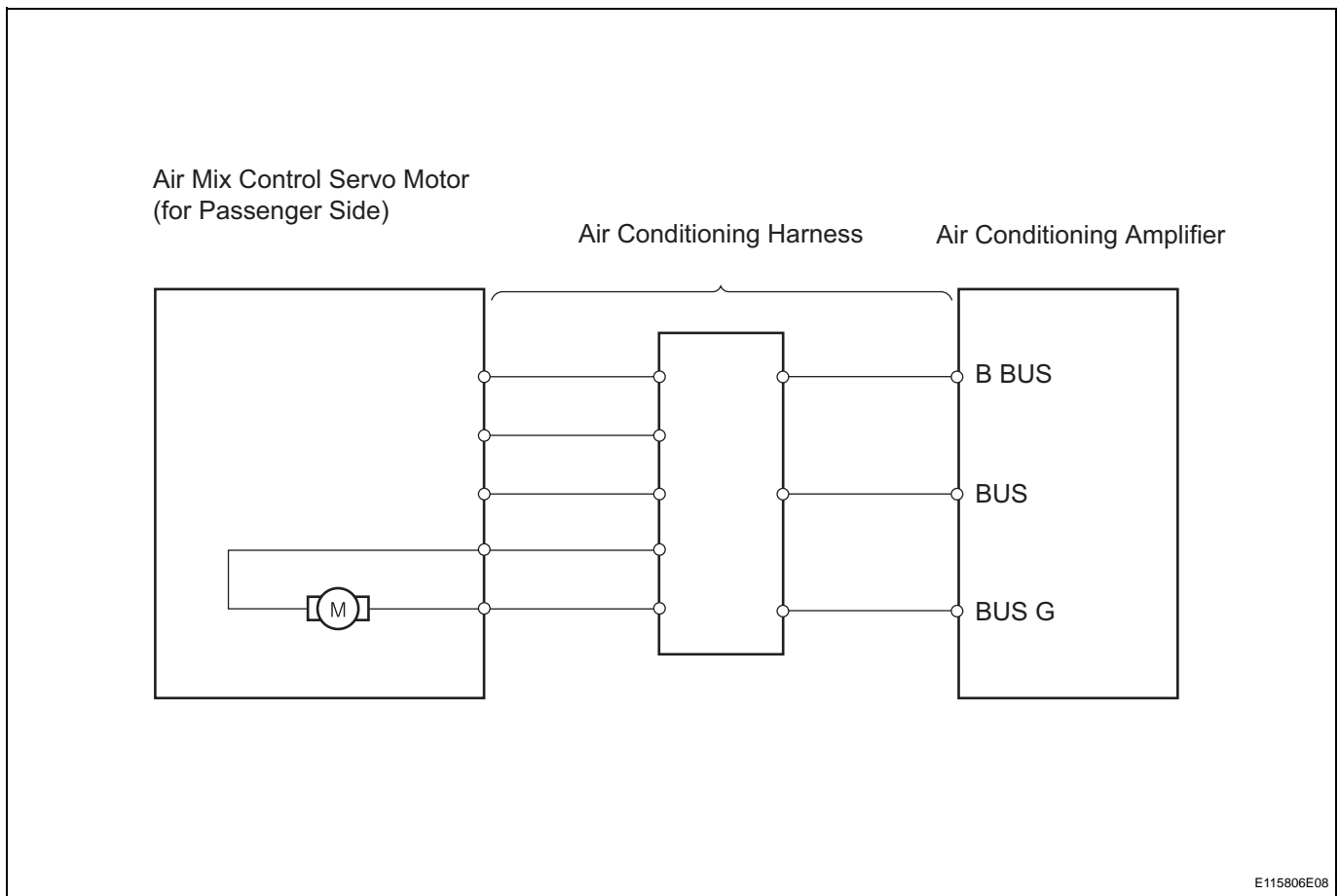
The air mix damper servo sends pulse signals to indicate the damper position to the air conditioning amplifier. The air conditioning amplifier activates the motor (normal or reverse) based on these signals to move the air mix damper (passenger seat) to the appropriate position. This adjusts the amount of air passing through the heater core after passing the evaporator and controls the temperature of the blown air.

HINT:

Confirm that there are no mechanical problems because this DTC can be output when either a damper link or damper is mechanically locked.

DTC No.	DTC Detection Condition	Trouble Area
B1441/41	Air mix damper position does not change even if air conditioning amplifier operates air mix control servo motor	<ul style="list-style-type: none"> Air mix control servo motor Air conditioning harness Air conditioning amplifier

WIRING DIAGRAM



INSPECTION PROCEDURE

1 READ VALUE OF INTELLIGENT TESTER (AIR MIX PULSE-P)

- (a) Connect the intelligent tester (with CAN VIM) to the DLC3.
- (b) Turn the ignition switch ON and turn the intelligent tester main switch ON.
- (c) Select the items below in the DATA LIST, and read the value displayed on the intelligent tester.

Air conditioning amplifier

Item	Measurement Item / Display (Range)	Normal Condition	Diagnostic Note
AIR MIX PULSE-P	Passenger side air mix servo motor target pulse / Min.: 0, Max.: 255	Customized value displayed	-

OK:

The display is as specified in the normal condition column.

Result

Result	Proceed to
NG	A
OK (Checking from PROBLEM SYMPTOMS TABLE)	B
OK (Checking from DTC)	C

B

PROCEED TO NEXT CIRCUIT INSPECTION SHOWN IN PROBLEM SYMPTOMS TABLE

C

REPLACE AIR CONDITIONING AMPLIFIER

A**2 REPLACE AIR MIX CONTROL SERVO MOTOR****HINT:**

Since the servo motor cannot be tested when it is removed from the vehicle, replace the servo motor with a normal one and check that the condition returns to normal.

OK:

Same problem does not occur.

NG

REPAIR OR REPLACE AIR CONDITIONING HARNESS ASSEMBLY

OK**SYSTEM IS OK**

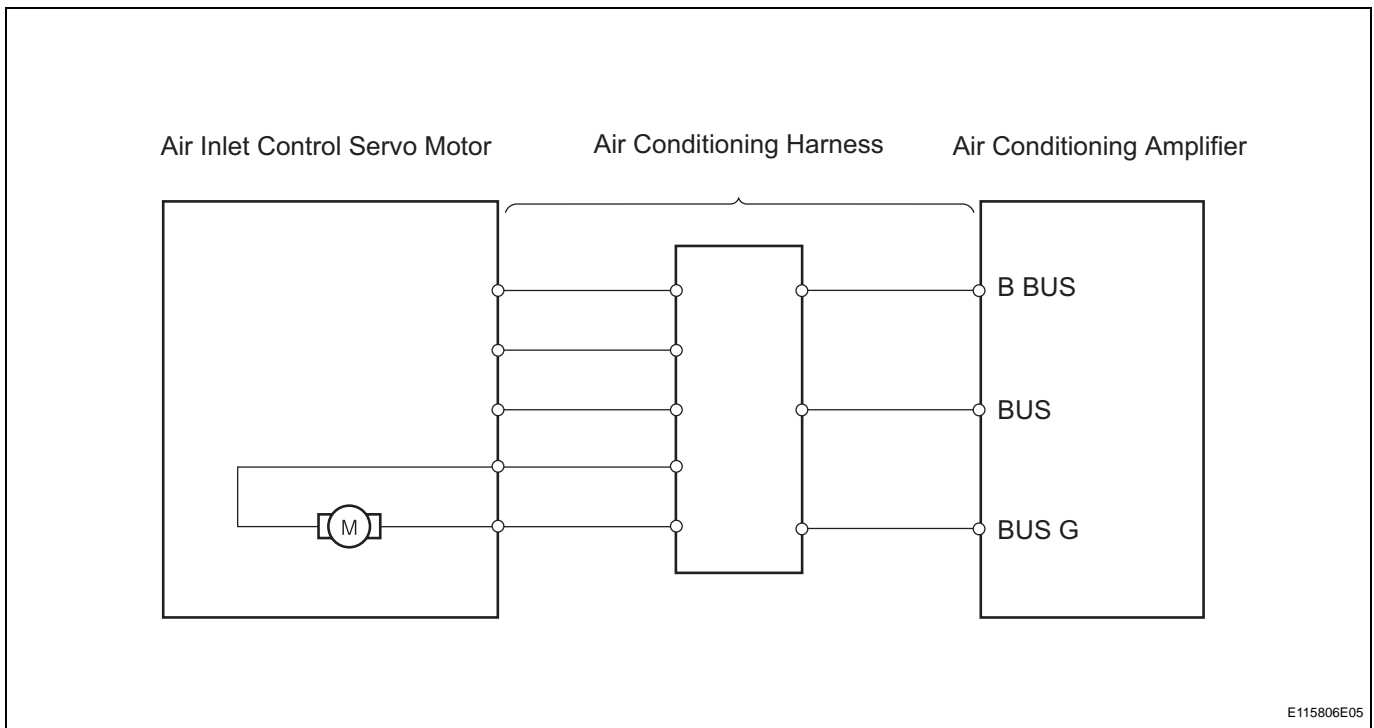
DTC**B1442/42****Air Inlet Damper Control Servo Motor Circuit****DESCRIPTION**

The damper servo (air inlet control) sends pulse signals to indicate the damper position to the air conditioning amplifier. The air conditioning amplifier activates the motor (normal or reverse) based on these signals to move the air inlet control damper to the appropriate position, which controls the intake air settings (FRESH, FRESH / RECIRCULATION and RECIRCULATION).

HINT:

Confirm that there are no mechanical problems because this DTC can be output when either a damper link or damper is mechanically locked.

DTC No.	DTC Detection Condition	Trouble Area
B1442/42	Air inlet damper position does not change even if air conditioning amplifier operates air inlet damper control servo motor	<ul style="list-style-type: none"> Air inlet control servo motor Air conditioning harness Air conditioning amplifier

WIRING DIAGRAM**AC****INSPECTION PROCEDURE****1****READ VALUE OF INTELLIGENT TESTER (A/I DAMP TARG PLS)**

- Connect the intelligent tester (with CAN VIM) to the DLC3.
- Turn the ignition switch ON and turn the intelligent tester main switch ON.
- Select the items below in the DATA LIST, and read the value displayed on the intelligent tester.

Air conditioning amplifier

Item	Measurement Item / Display (Range)	Normal Condition	Diagnostic Note
A/I DAMP PLS	Air inlet damper target pulse / Min.: 0, Max.: 255	Customized value displayed	-

OK:

The display is as specified in the normal condition column.

Result

Result	Proceed to
NG	A
OK (Checking from PROBLEM SYMPTOMS TABLE)	B
OK (Checking from DTC)	C

B

PROCEED TO NEXT CIRCUIT INSPECTION SHOWN IN PROBLEM SYMPTOMS TABLE

C

REPLACE AIR CONDITIONING AMPLIFIER

A

2

REPLACE DAMPER SERVO SUB-ASSEMBLY

HINT:

Since the servo motor cannot be tested when it is removed from the vehicle, replace the servo motor with a normal one and check that the condition returns to normal.

OK:

Same problem does not occur.

NG

REPAIR OR REPLACE AIR CONDITIONING HARNESS ASSEMBLY

OK

SYSTEM IS OK

DTC

B1443/43

Air Outlet Damper Control Servo Motor Circuit

DESCRIPTION

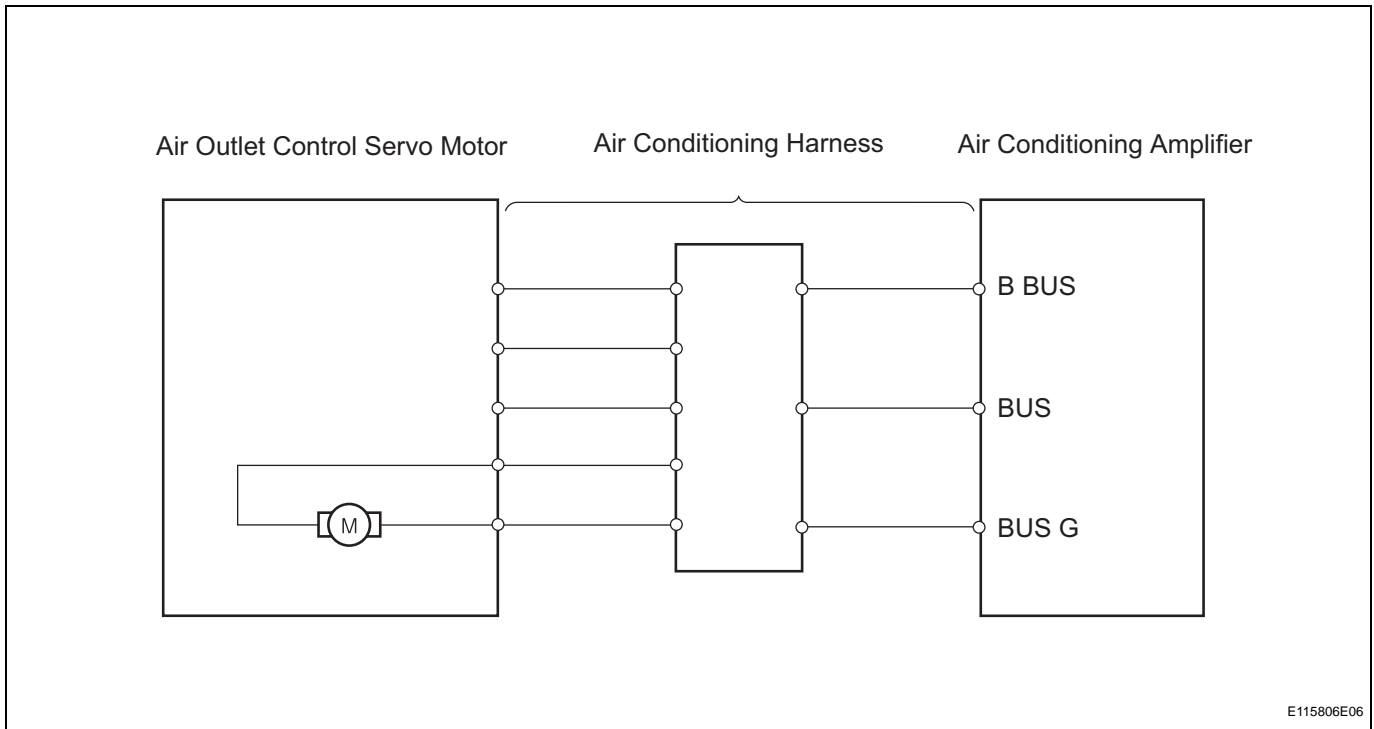
The damper servo sends pulse signals to indicate the damper position to the air conditioning amplifier. The air conditioning amplifier activates the motor (normal or reverse) based on these signals to move the mode damper to the appropriate position, which controls the air outlet modes.

HINT:

Confirm that there are no mechanical problems because this DTC can be output when either a damper link or damper is mechanically locked.

DTC No.	DTC Detection Condition	Trouble Area
B1443/43	Air outlet damper position does not change even if air conditioning amplifier operates air outlet damper control servo motor	<ul style="list-style-type: none"> Air outlet control servo motor Air conditioning harness Air conditioning amplifier

WIRING DIAGRAM



AC

INSPECTION PROCEDURE

1

READ VALUE OF INTELLIGENT TESTER (AIR OUT PULSE)

- Connect the intelligent tester (with CAN VIM) to the DLC3.
- Turn the ignition switch ON and turn the intelligent tester main switch ON.
- Select the items below in the DATA LIST, and read the value displayed on the intelligent tester.

Air conditioning amplifier

Item	Measurement Item / Display (Range)	Normal Condition	Diagnostic Note
AIR OUT PULSE	Air outlet servo motor target pulse / Min.: 0, Max.: 255	Customized value displayed	-

OK:

The display is as specified in the normal condition column.

Result

Result	Proceed to
NG	A
OK (Checking from PROBLEM SYMPTOMS TABLE)	B
OK (Checking from DTC)	C

B

PROCEED TO NEXT CIRCUIT INSPECTION
SHOWN IN PROBLEM SYMPTOMS TABLE

C

REPLACE AIR CONDITIONING AMPLIFIER

A

2

REPLACE MODE DAMPER SERVO SUB-ASSEMBLY

HINT:

Since the servo motor cannot be tested when it is removed from the vehicle, replace the servo motor with a normal one and check that the condition returns to normal.

OK:

Same problem does not occur.

NG

REPAIR OR REPLACE AIR CONDITIONING
HARNESS ASSEMBLY

OK

SYSTEM IS OK

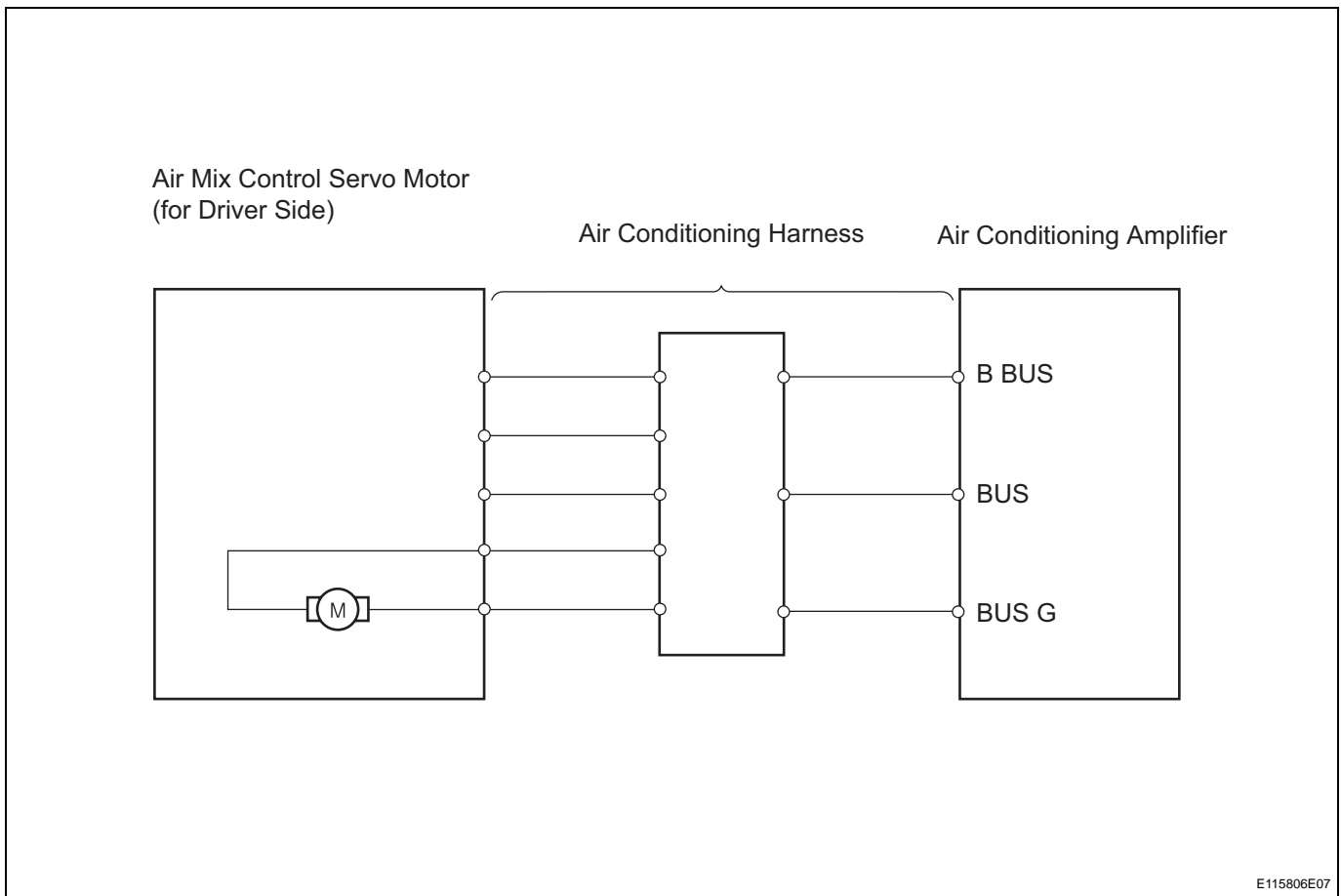
DTC**B1446/46****Air Mix Damper Control Servo Motor Circuit
(Driver Side)****DESCRIPTION**

The air mix damper servo sends pulse signals to indicate the damper position to the air conditioning amplifier. The air conditioning amplifier activates the motor (normal or reverse) based on these signals to move the air mix damper (driver seat) to the appropriate position. This adjusts the amount of air passing through the heater core after passing the evaporator and controls the temperature of the blown air.

HINT:

Confirm that there are no mechanical problems because this DTC can be output when either a damper link or damper is mechanically locked.

DTC No.	DTC Detection Condition	Trouble Area
B1446/46	Air mix damper position does not change even if air conditioning amplifier operates air mix control servo motor	<ul style="list-style-type: none"> Air mix control servo motor Air conditioning harness Air conditioning amplifier

WIRING DIAGRAM**AC****INSPECTION PROCEDURE****1****READ VALUE OF INTELLIGENT TESTER (AIR MIX SERVO TARG PULSE (D))**

- (a) Connect the intelligent tester (with CAN VIM) to the DLC3.

- (b) Turn the ignition switch ON and turn the intelligent tester main switch ON.
- (c) Select the items below in the DATA LIST, and read the value displayed on the intelligent tester.

Air conditioning amplifier

Item	Measurement Item / Display (Range)	Normal Condition	Diagnostic Note
AIR MIX PULSE-D	Driver side air mix servo motor target pulse / Min.: 0, Max.: 255	Customized value displayed	-

OK:

The display is as specified in the normal condition column.

Result

Result	Proceed to
NG	A
OK (Checking from PROBLEM SYMPTOMS TABLE)	B
OK (Checking from DTC)	C

B

PROCEED TO NEXT CIRCUIT INSPECTION SHOWN IN PROBLEM SYMPTOMS TABLE

C

REPLACE AIR CONDITIONING AMPLIFIER

A**2****REPLACE AIR MIX CONTROL SERVO MOTOR****AC****HINT:**

Since the servo motor cannot be tested when it is removed from the vehicle, replace the servo motor with a normal one and check that the condition returns to normal.

OK:

Same problem does not occur.

NG

REPAIR OR REPLACE AIR CONDITIONING HARNESS

OK**SYSTEM IS OK**

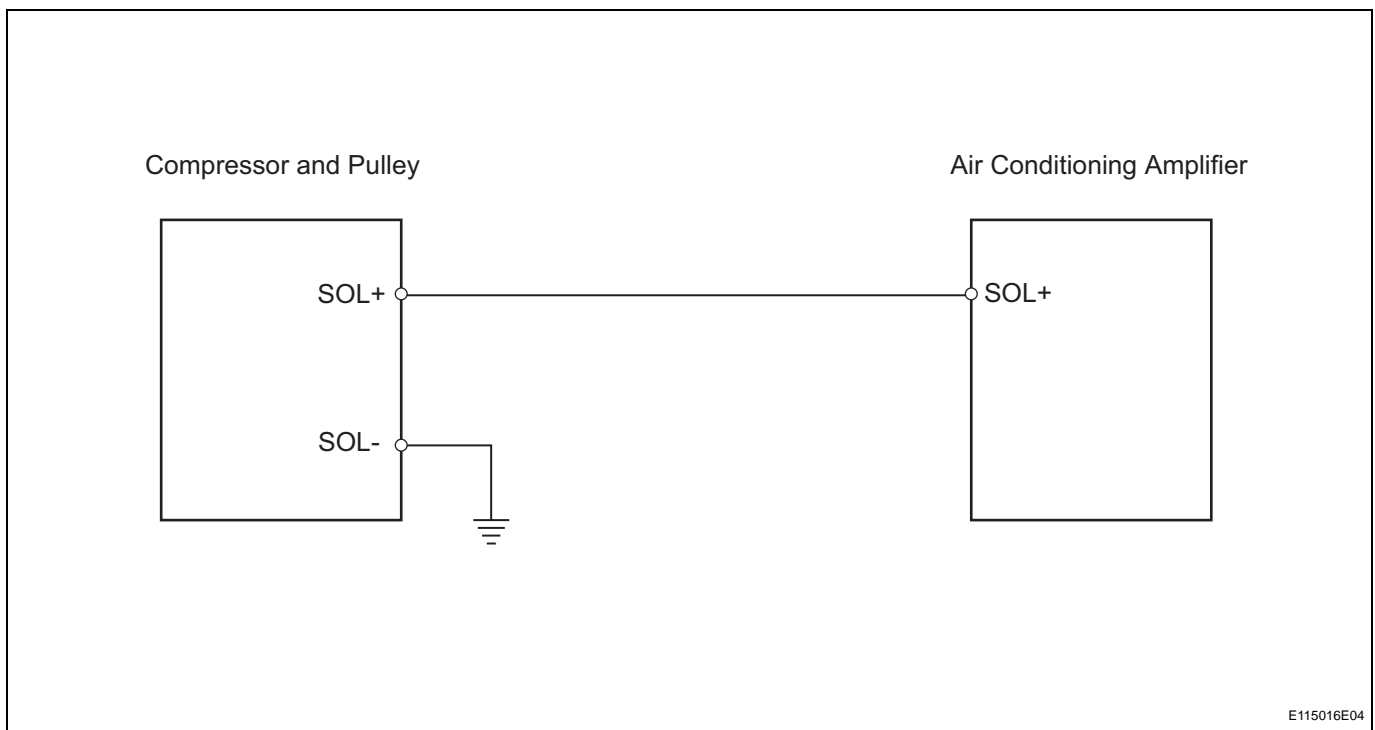
DTC	B1451/51	Compressor Solenoid Circuit (2005/11-2006/01)
------------	-----------------	---

DESCRIPTION

In this circuit, the compressor receives a refrigerant compression demand signal from the air conditioning amplifier. Based on this signal, the compressor changes the degree of refrigerant compression.

DTC No.	DTC Detection Condition	Trouble Area
B1451/51	Open or short in solenoid of externally changeable compressor circuit	<ul style="list-style-type: none"> Compressor and pulley Harness and connector between air conditioning amplifier and compressor and pulley Air conditioning amplifier

WIRING DIAGRAM



AC

INSPECTION PROCEDURE

1	READ VALUE OF INTELLIGENT TESTER (REG CTRL CURRNT)
----------	---

- Connect the intelligent tester (with CAN VIM) to the DLC3.
- Turn the ignition switch ON and turn the intelligent tester main switch ON.
- Select the items below in the DATA LIST, and read the value displayed on the intelligent tester.

Air conditioning amplifier

Item	Measurement Item / Display (Range)	Normal Condition	Diagnostic Note
REG CTRL CURRNT	Regulator control current / Min.: 0 A Max.: 0.997 A	Value changes between 0 A and 0.997 A in accordance with compressor and pulley operation	-

OK:

The display is as specified in the normal condition column.

Result

Result	Proceed to
NG	A
OK (Checking from the PROBLEM SYMPTOMS TABLE)	B
OK (Checking from the DTC)	C

B

PROCEED TO NEXT CIRCUIT INSPECTION SHOWN IN PROBLEM SYMPTOMS TABLE

C

REPLACE AIR CONDITIONING AMPLIFIER

A

2

INSPECT COMPRESSOR AND PULLEY

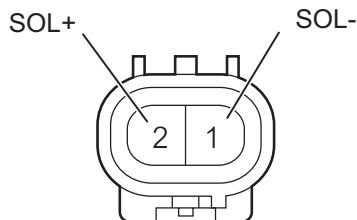
- (a) Disconnect the compressor and pulley.
(b) Measure the resistance of the connector.

Standard resistance

Tester Connection	Condition	Specified Condition
1 (SOL-) - 2 (SOL+)	25°C (77°F)	10.1 to 11.1 Ω

NG

REPLACE COMPRESSOR AND PULLEY

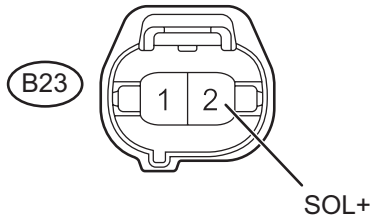


OK

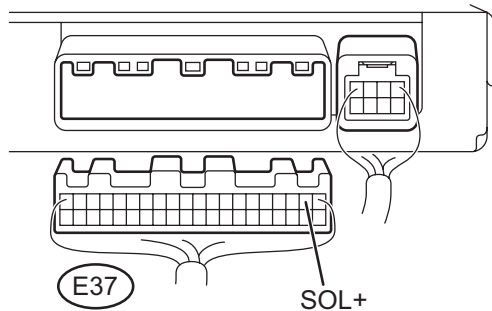
3 CHECK WIRE HARNESS (COMPRESSOR AND PULLEY - AIR CONDITIONING AMPLIFIER)

Wire Harness Side

Compressor and Pulley



Air Conditioning Amplifier



E115955E03

- Disconnect the B23 compressor and pulley connector.
- Disconnect the E37 amplifier connector.
- Measure the resistance of the wire harness side connectors.

Standard resistance

Tester Connection	Specified Condition
B23-2 (SOL+) - E37-2 (SOL+)	Below 1 Ω
B23-2 (SOL+) - Body Ground	1 M Ω or higher

NG

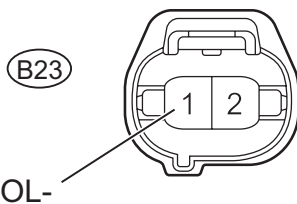
REPAIR OR REPLACE HARNESS AND CONNECTOR

OK

4 CHECK WIRE HARNESS (COMPRESSOR AND PULLEY - BODY GROUND)

Wire Harness Side

Compressor and Pulley



E119774E02

- Disconnect the B23 compressor and pulley connector.
- Measure the resistance of the wire harness side connector.

Standard resistance

Tester Connection	Specified Condition
B23-1 (SOL-) - Body ground	Below 1 Ω

NG

REPAIR OR REPLACE HARNESS AND CONNECTOR

AC

OK

REPLACE AIR CONDITIONING AMPLIFIER

DTC**B1451/51****Compressor Solenoid Circuit**

(2006/01-)

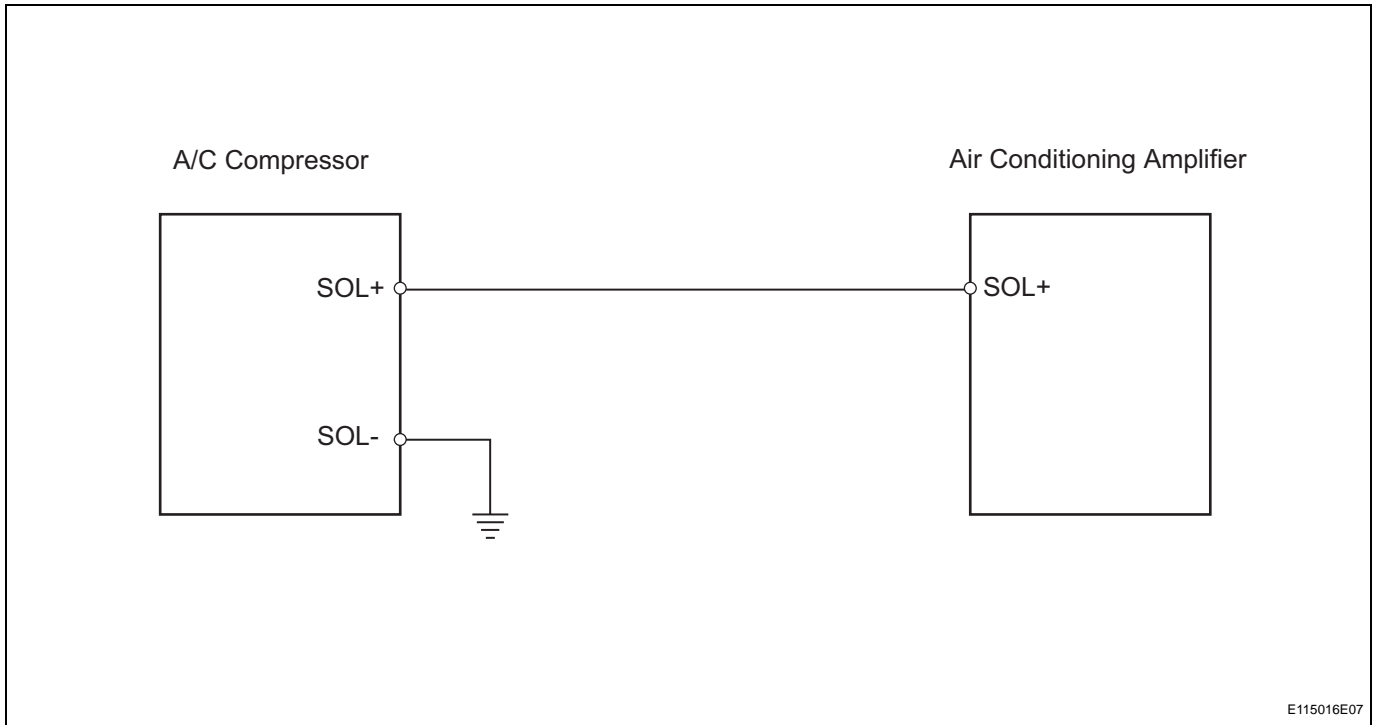
DESCRIPTION

In this circuit, the compressor receives a refrigerant compression demand signal from the air conditioning amplifier. Based on this signal, the compressor changes the degree of refrigerant compression.

DTC No.	DTC Detection Condition	Trouble Area
B1451/51	Open or short in solenoid of externally changeable compressor circuit	<ul style="list-style-type: none">• A/C compressor*• Wire harness and connector between air conditioning amplifier and A/C compressor*• Air conditioning amplifier

HINT:

*: Compressor and pulley for 2AZ-FE, compressor and magnetic clutch for 2GR-FE

WIRING DIAGRAM**AC****INSPECTION PROCEDURE****1****READ VALUE OF INTELLIGENT TESTER (REG CTRL CURRNT)**

- Connect the intelligent tester (with CAN VIM) to the DLC3.
- Turn the ignition switch ON and turn the intelligent tester main switch ON.
- Select the items below in the DATA LIST, and read the value displayed on the intelligent tester.

Air conditioning amplifier

Item	Measurement Item / Display (Range)	Normal Condition	Diagnostic Note
REG CTRL CURRNT	Regulator control current / Min.: 0 A Max.: 0.997 A	Value changes between 0 A and 0.997 A in accordance with A/C compressor operation	-

OK:

The display is as specified in the normal condition column.

Result

Result	Proceed to
NG	A
OK (Checking from the PROBLEM SYMPTOMS TABLE)	B
OK (Checking from the DTC)	C

B

PROCEED TO NEXT CIRCUIT INSPECTION
SHOWN IN PROBLEM SYMPTOMS TABLE

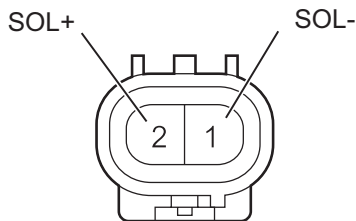
C

REPLACE AIR CONDITIONING AMPLIFIER

A

2

INSPECT A/C COMPRESSOR



- (a) Disconnect the A/C compressor clutch connector.
(b) Measure the resistance of the connector.

Standard resistance

Tester Connection	Condition	Specified Condition
1 (SOL-) - 2 (SOL+)	25°C (77°F)	10.1 to 11.1 Ω

NG

REPLACE A/C COMPRESSOR

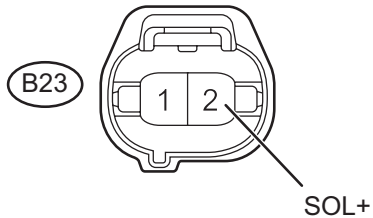
OK

3

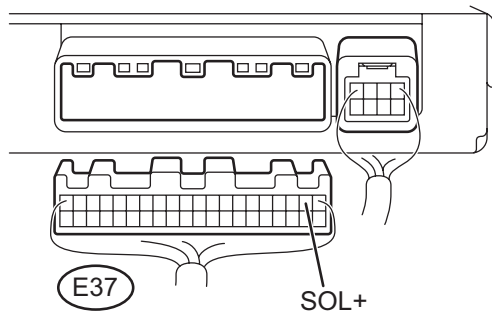
CHECK WIRE HARNESS (A/C COMPRESSOR - AIR CONDITIONING AMPLIFIER)

Wire Harness Side

A/C Compressor



Air Conditioning Amplifier



E115955E05

- Disconnect the B23 A/C compressor connector.
- Disconnect the E37 amplifier connector.
- Measure the resistance of the wire harness side connectors.

Standard resistance

Tester Connection	Specified Condition
B23-2 (SOL+) - E37-2 (SOL+)	Below 1 Ω
B23-2 (SOL+) - Body Ground	1 M Ω or higher

NG

REPAIR OR REPLACE HARNESS AND CONNECTOR

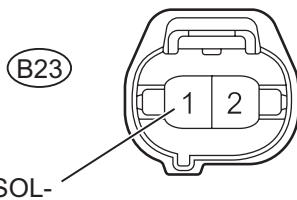
OK

AC

4

CHECK WIRE HARNESS (A/C COMPRESSOR - BODY GROUND)

Wire Harness Side



E119774E07

- Disconnect the B23 A/C compressor connector.
- Measure the resistance of the wire harness side connector.

Standard resistance

Tester Connection	Specified Condition
B23-1 (SOL-) - Body ground	Below 1 Ω

NG

REPAIR OR REPLACE HARNESS AND CONNECTOR

OK

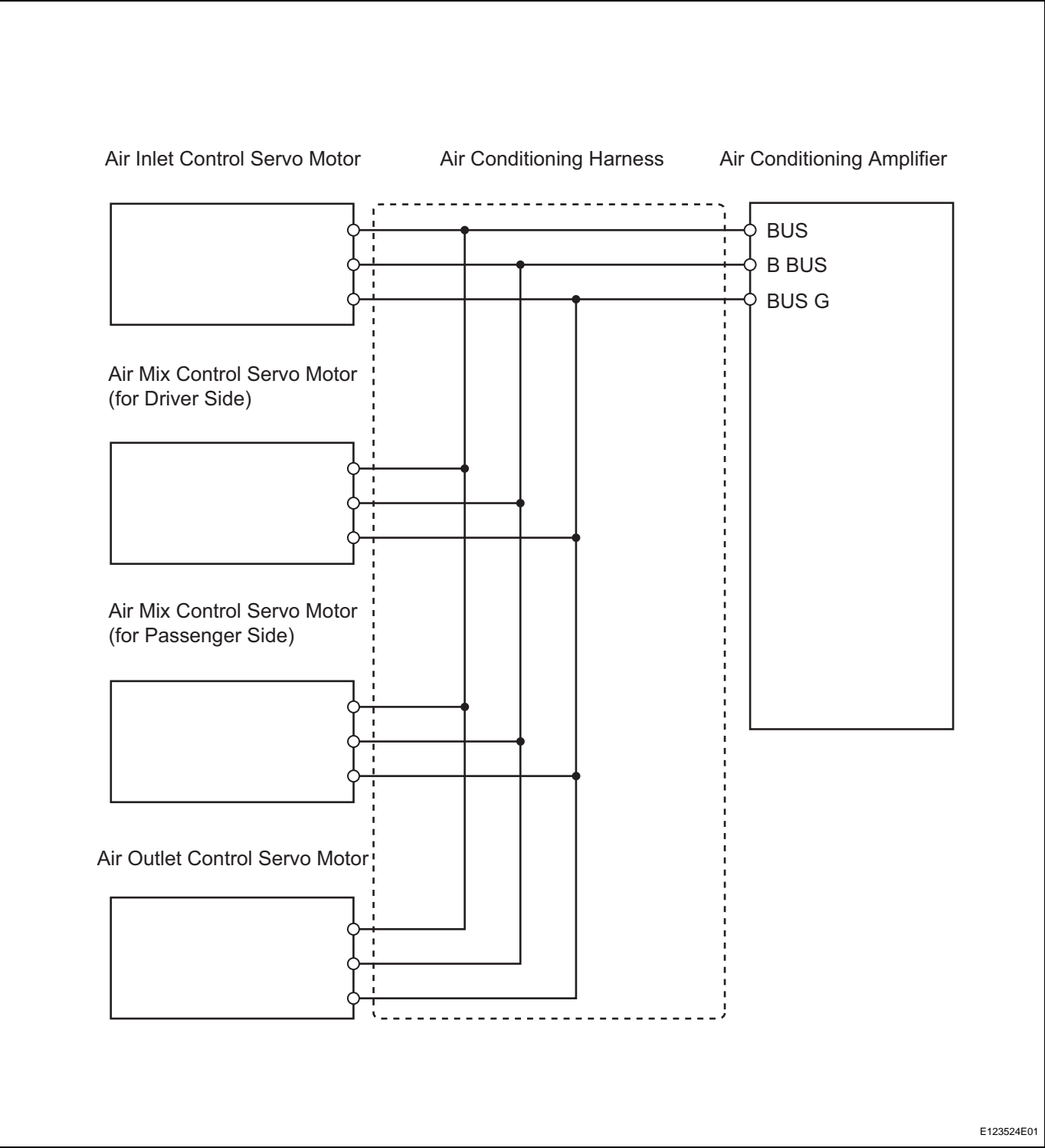
REPLACE AIR CONDITIONING AMPLIFIER

DTC**B1497/97****BUS IC Communication Malfunction****DESCRIPTION**

The air conditioning harness connects the air conditioning amplifier and the servos. The air conditioning amplifier supplies power and sends operation instructions to each servo through the air conditioning harness. Each servo sends damper position information to the air conditioning amplifier.

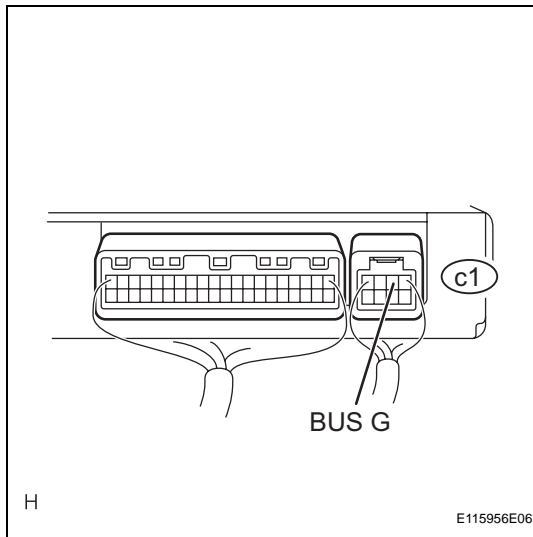
DTC No.	DTC Detection Condition	Trouble Area
B1497/97	Communication line error or open	<ul style="list-style-type: none">• Air conditioning harness• Air conditioning amplifier

WIRING DIAGRAM



INSPECTION PROCEDURE

1 CHECK AIR CONDITIONING AMPLIFIER



- Remove the air conditioning amplifier with its connectors still connected.
- Measure the resistance of the wire harness side connector.

Standard resistance

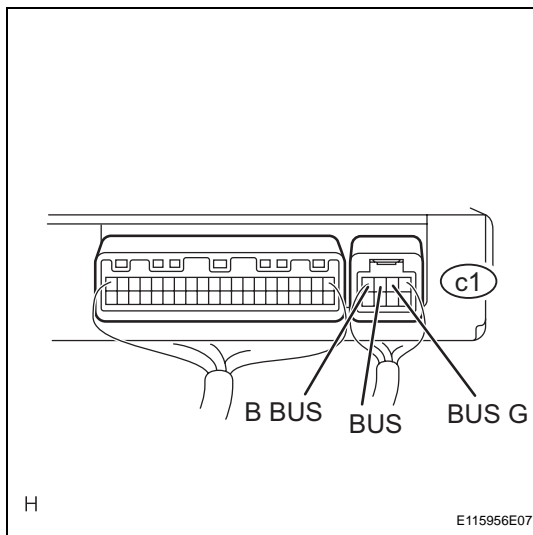
Tester Connection	Specified Condition
c1-2 (BUS G) - Body ground	Below 1 Ω

NG

CHECK GROUND LINE AND AIR CONDITIONING AMPLIFIER

OK

2 CHECK AIR CONDITIONING AMPLIFIER



- Remove the air conditioning amplifier with its connectors still connected.
- Measure the voltage of the wire harness side connector.

Standard voltage

Tester Connection	Condition	Specified Condition
c1-2 (BUS G) - c1-4 (B BUS)	Ignition switch ON	11 to 13 V
c1-2 (BUS G) - c1-3 (BUS)	Ignition switch ON	Pulse generation

NG

REPLACE AIR CONDITIONING AMPLIFIER

OK

REPLACE AIR CONDITIONING HARNESS ASSEMBLY

AC

DTC

B1499/99

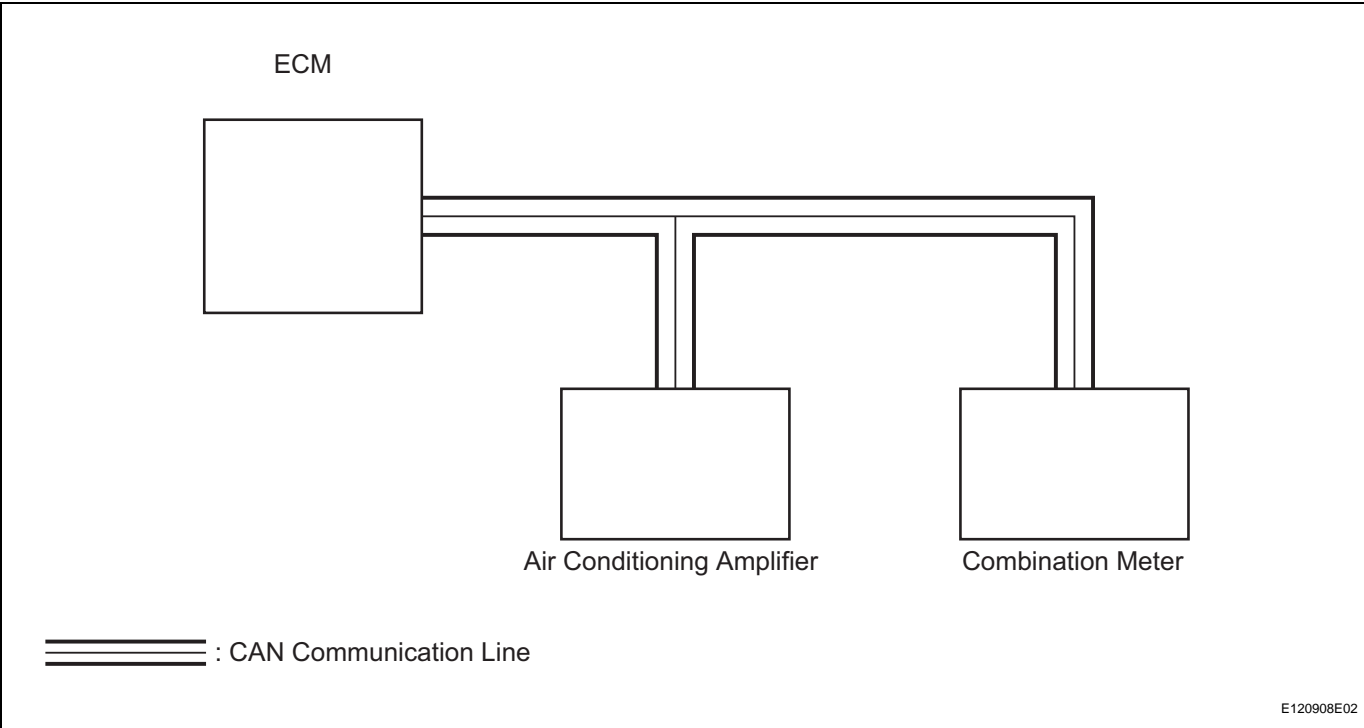
Multiplex Communication Circuit

DESCRIPTION

The air conditioning amplifier communicates data with the ECM and combination meter through the CAN communication system.

DTC No.	DTC Detection Condition	Trouble Area
B1499/99	Open in CAN communication line	<ul style="list-style-type: none">• Air conditioning amplifier• ECM• Combination meter• CAN communication line

WIRING DIAGRAM



INSPECTION PROCEDURE

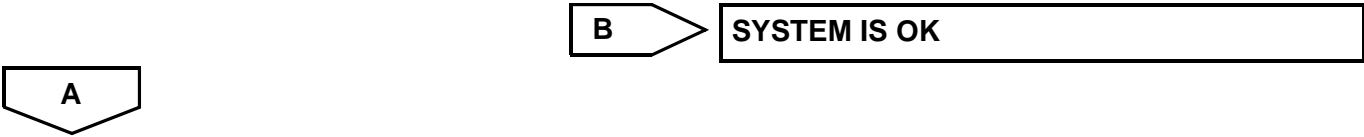
1

CHECK DTC

- (a) Clear the DTC (see page AC-31).
- (b) Read the DTC (see page AC-31).

Result

Result	Proceed to
DTC (B1499/99) is output	A (see page CA-1)
DTC (B1499/99) is not output	B



GO TO CAN COMMUNICATION SYSTEM

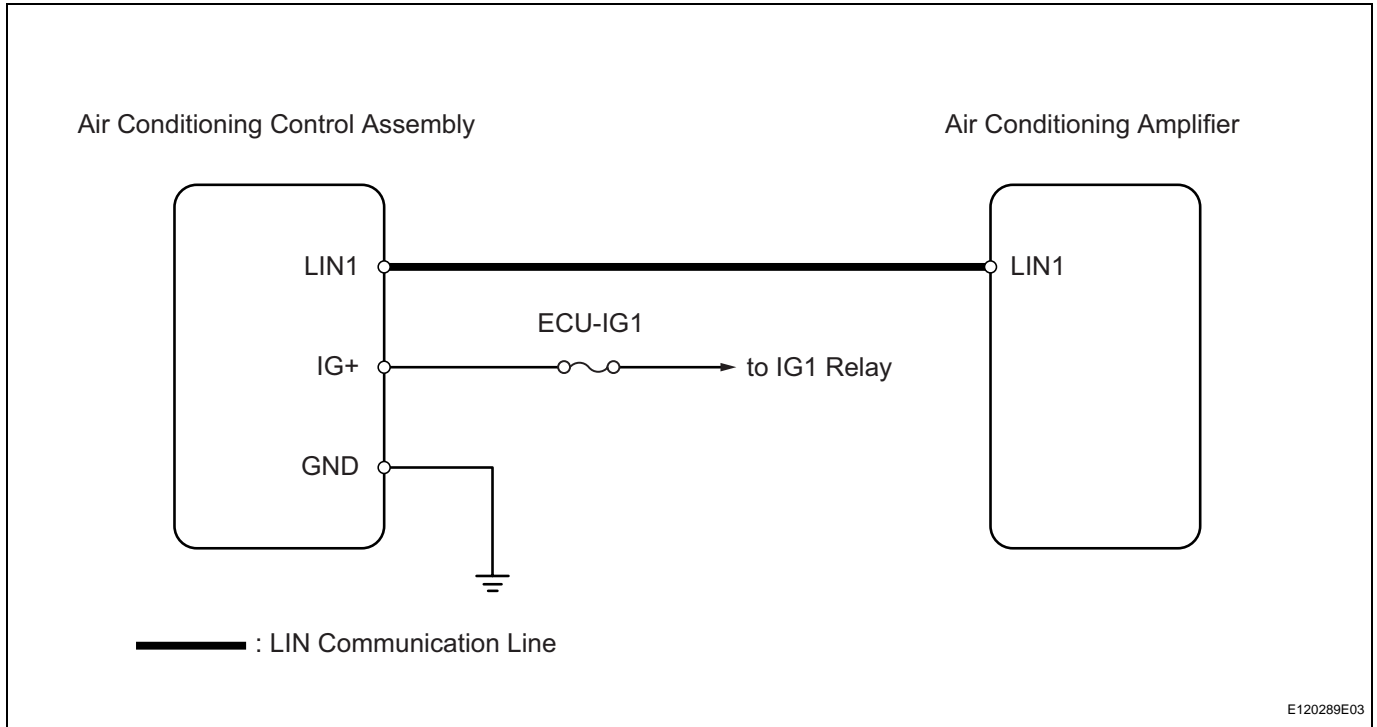
Air Conditioning Control Panel does not Operate

DESCRIPTION

This circuit consists of the air conditioning control and the air conditioning amplifier. When the air conditioning control is operated, signals are transmitted to the air conditioning amplifier through the LIN communication system.

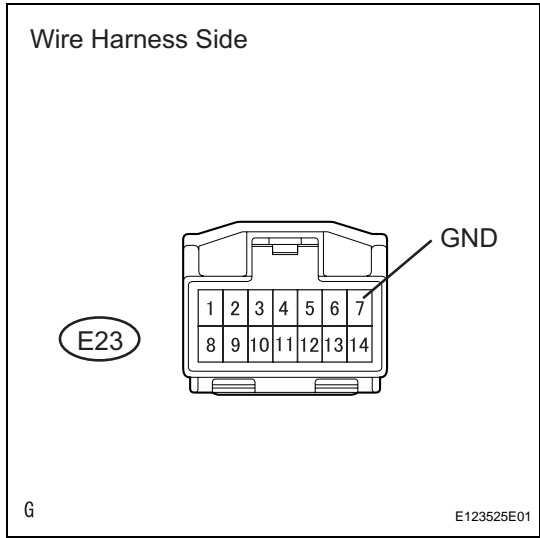
If the LIN communication system malfunctions, the air conditioning amplifier does not operate even if the air conditioning control is operated.

WIRING DIAGRAM



INSPECTION PROCEDURE

1 CHECK WIRE HARNESS (AIR CONDITIONING CONTROL ASSEMBLY - BODY GROUND)



- (a) Disconnect the air conditioning control assembly connector.
- (b) Measure the resistance of the wire harness side connector.

Standard resistance

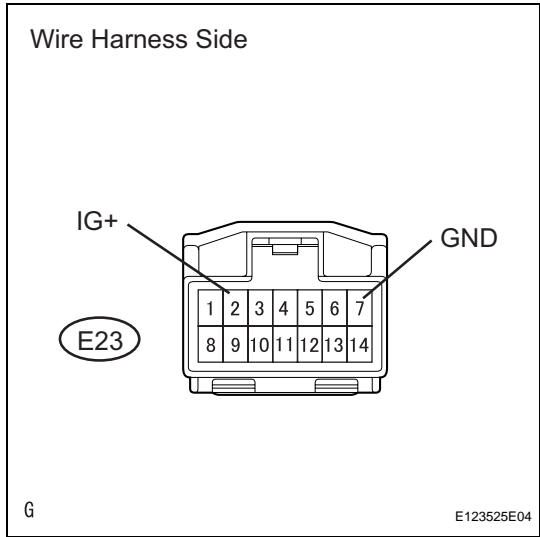
Tester Connection	Specified Condition
E23-7 (GND) - Body ground	Below 1 Ω

NG

REPAIR OR REPLACE HARNESS AND CONNECTOR

OK

2 CHECK WIRE HARNESS (AIR CONDITIONING CONTROL ASSEMBLY - BATTERY)



- (a) Disconnect the E23 air conditioning control assembly connector.
- (b) Measure the voltage of the wire harness side connector.

Standard voltage

Tester Connection	Condition	Specified Condition
E23-7 (GND) - E23-2 (IG+)	Ignition switch ON	10 to 14 V

NG

REPAIR OR REPLACE HARNESS AND CONNECTOR

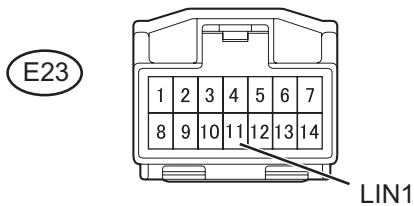
OK

3

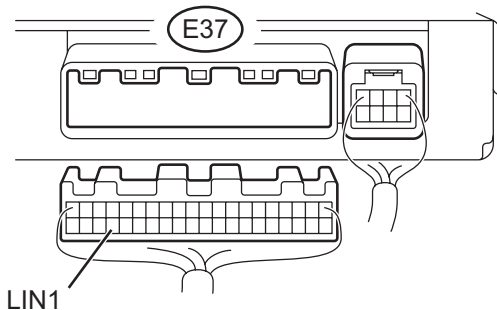
CHECK WIRE HARNESS (AIR CONDITIONING AMPLIFIER - AIR CONDITIONING CONTROL)

Wire Harness Side

Air Conditioning Control Assembly



Air Conditioning Amplifier



E123519E01

- (a) Disconnect the E23 control connector.
- (b) Disconnect the E37 amplifier connector.
- (c) Measure the resistance of the wire harness side connectors.

Standard resistance

Tester Connection	Specified Condition
E37-37 (LIN1) - E23-11 (LIN1)	Below 1 Ω

NG

REPAIR OR REPLACE HARNESS AND CONNECTOR

OK

4

REPLACE AIR CONDITIONING AMPLIFIER

- (a) Replace the air conditioning control with a new or properly functioning one.
- (b) Operate the air conditioning control to check that it functions properly.

Result

Result	Proceed to
Air conditioning control malfunctions	A
Air conditioning control functions properly	B

B

END (AIR CONDITIONING CONTROL ASSEMBLY IS FAULTY)

A

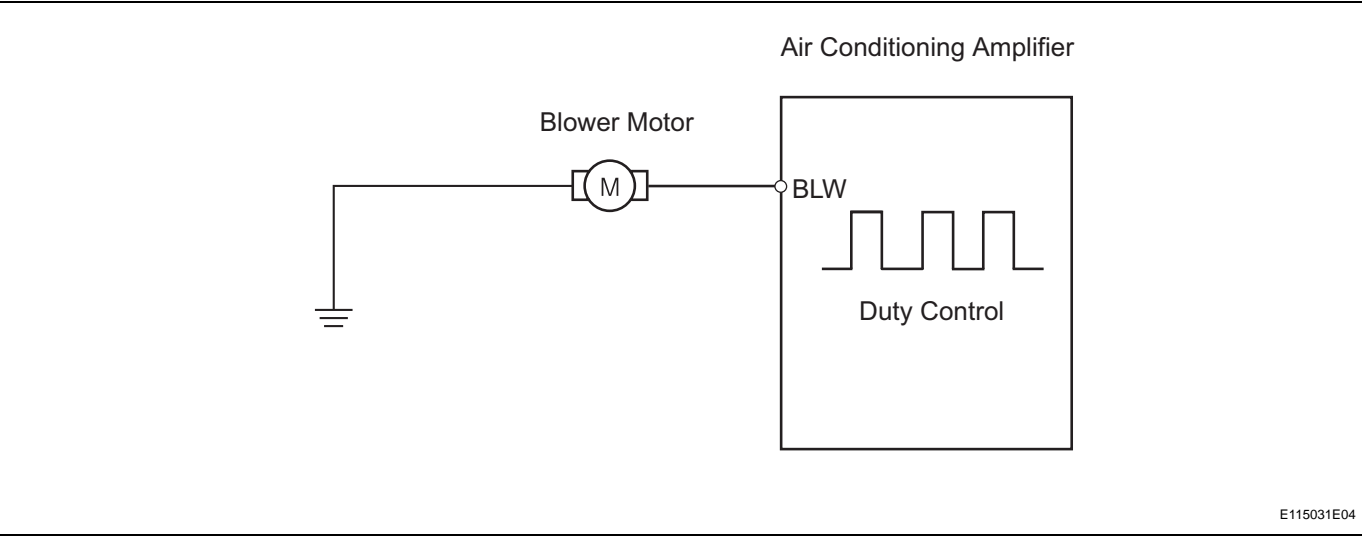
REPLACE AIR CONDITIONING AMPLIFIER

AC

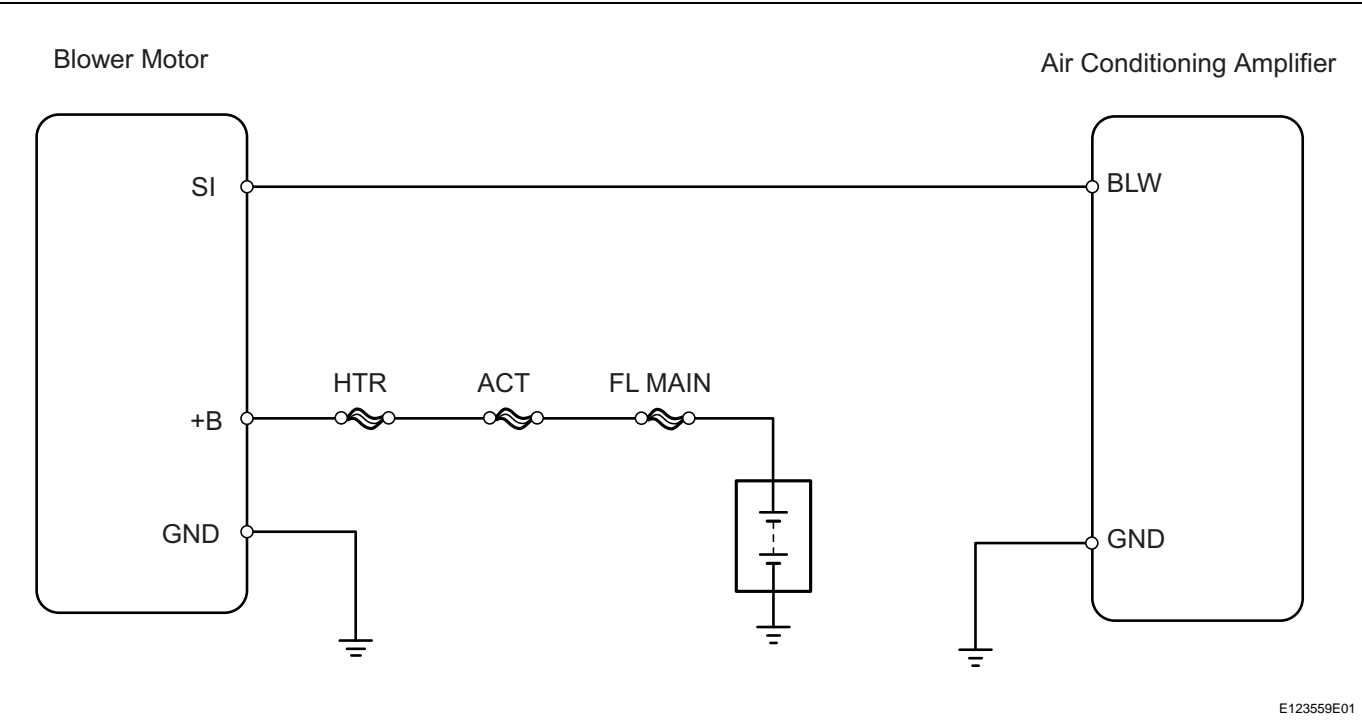
Blower Motor Circuit

DESCRIPTION

The blower motor is operated by signals from the air conditioning amplifier. Blower motor speed signals are transmitted in accordance with changes in the duty ratio.



WIRING DIAGRAM



INSPECTION PROCEDURE

1	PERFORM ACTIVE TEST BY INTELLIGENT TESTER (BLOWER MOTOR)
---	--

- (a) Connect the intelligent tester to (with CAN VIM) the DLC3.

- (b) Turn the ignition switch ON and turn the intelligent tester main switch ON.
- (c) Select the item below in the ACTIVE TEST, and then check that the blower motor operates.

Air conditioning amplifier

Item	Test Details / Display	Diagnostic Note
BLOWER MOTOR	Blower motor / Min.: 0, Max.: 31	-

Result

Result	Proceed to
NG (blower motor does not operate)	A
NG (blower motor operates but does not change speed)	B
OK	C

B

Go to step 6

C

PROCEED TO NEXT CIRCUIT INSPECTION SHOWN IN PROBLEM SYMPTOMS TABLE

A

2 INSPECT FUSE (HTR)

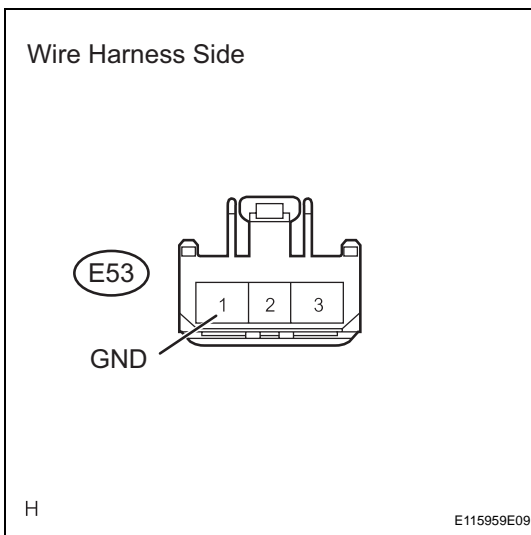
- (a) Remove the HTR H-fuse from the engine room No. 2 relay block.
- (b) Measure the resistance of the H-fuse.
Standard resistance:
Below 1 Ω

NG

REPLACE FUSE

OK

3 CHECK WIRE HARNESS (BLOWER MOTOR - BODY GROUND)



- (a) Disconnect the E53 motor connector.
- (b) Measure the resistance of the wire harness side connector.
Standard resistance

Tester Connection	Specified Condition
E53-1 (GND) - Body ground	Below 1 Ω

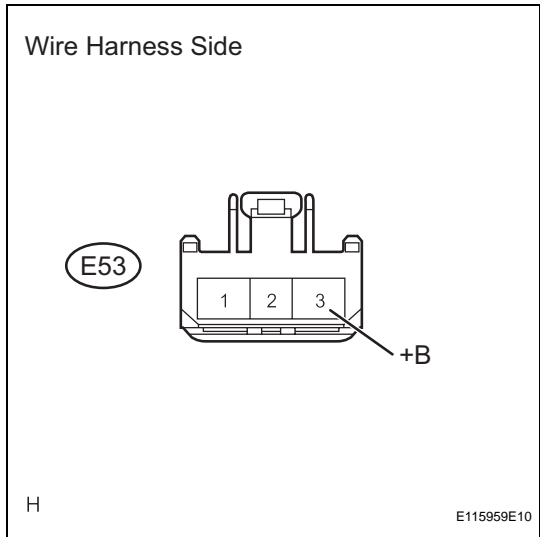
NG

REPAIR OR REPLACE HARNESS AND CONNECTOR

OK

4

CHECK WIRE HARNESS (BLOWER MOTOR - BATTERY)



- (a) Disconnect the E53 motor connector.
(b) Measure the voltage of the wire harness side connector.
- Standard voltage**

Tester Connection	Condition	Specified Condition
E53-3 (+B) - Body ground	Ignition switch ON	10 to 14 V

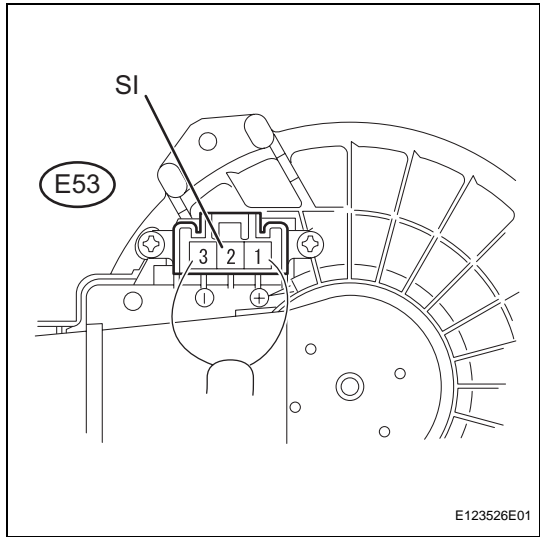
NG

REPAIR OR REPLACE HARNESS AND CONNECTOR

OK

5

CHECK BLOWER W/ FAN MOTOR SUB-ASSEMBLY



- (a) Disconnect the E37 amplifier connector.
(b) Connect the E53 motor connector.
(c) Measure the voltage of the connector.
- Standard voltage**

Tester Connection	Condition	Specified Condition
E53-2 (SI) - Body ground	Ignition switch ON	4.5 to 5.5 V

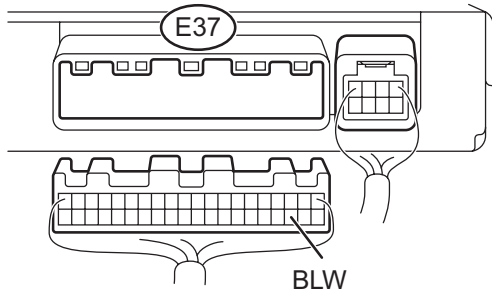
NG

REPLACE BLOWER W/ FAN MOTOR SUB-ASSEMBLY

OK

6 CHECK WIRE HARNESS (AIR CONDITIONING AMPLIFIER - BODY GROUND)

Wire Harness Side



- Disconnect the E37 amplifier connector.
- Measure the voltage of the wire harness side connector.

Standard voltage

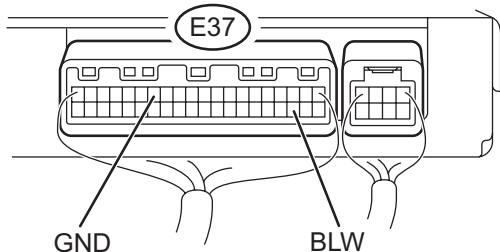
Tester Connection	Condition	Specified Condition
E37-23 (BLW) - Body ground	Ignition switch ON Blower switch OFF	4.5 to 5.5 V

NG

REPAIR OR REPLACE HARNESS AND CONNECTOR

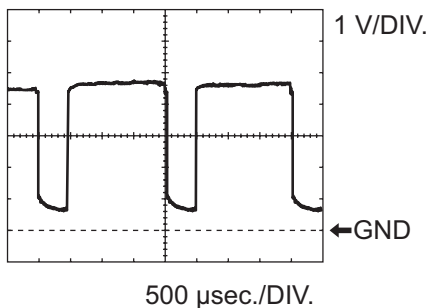
OK

7 CHECK AIR CONDITIONING AMPLIFIER



Waveform

Blower Motor Control Signal



- Remove the air conditioning amplifier with its connectors still connected.
- Check the waveform of the amplifier connector.

OK:

Waveform is as shown in the illustration.

HINT:

The waveform varies with the blower level.

Item	Content
Tester Connection	BLW (E37-23) - GND (E37-14)
Tool Setting	1 V/DIV., 500 μsec./DIV.
Condition	Ignition switch ON Blower switch LO

NG

REPLACE AIR CONDITIONING AMPLIFIER

AC

OK

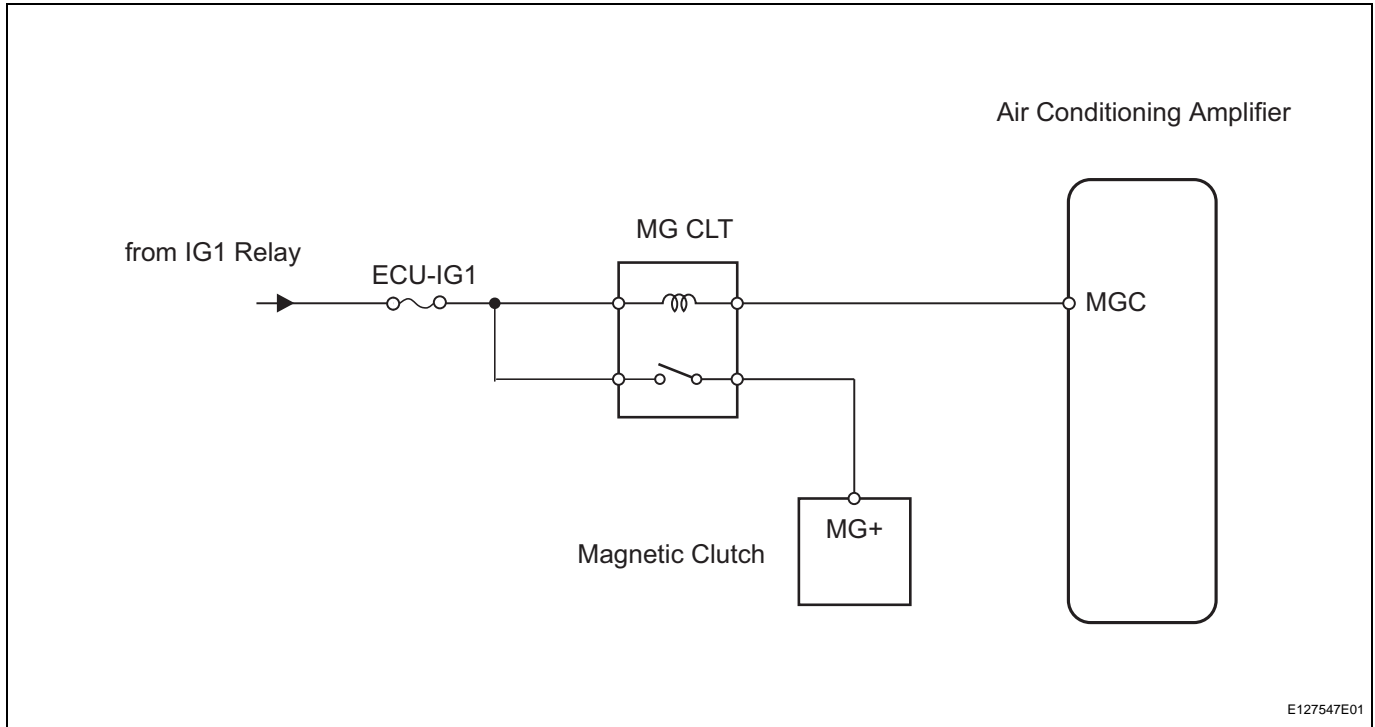
REPLACE BLOWER W/ FAN MOTOR SUB-ASSEMBLY

Compressor Circuit

DESCRIPTION

When the A/C switch is turned on, the magnetic clutch ON signal is sent from the air conditioning amplifier. Then the MG CLT relay turns on to operate the magnetic clutch.

WIRING DIAGRAM



INSPECTION PROCEDURE

AC

1 PERFORM ACTIVE TEST BY INTELLIGENT TESTER (A/C MAG CLUTCH)

- Connect the intelligent tester (with CAN VIM) to the DLC3.
- Turn the ignition switch ON and turn the intelligent tester main switch ON.
- Select the item below in the ACTIVE TEST and then check that the compressor magnetic relay operates.

Air conditioning amplifier

Item	Test Details / Display (Range)	Diagnostic Note
A/C MAG CLUTCH	Magnetic clutch relay / OFF, ON	Operating sound can be heard

OK

**PROCEED TO NEXT CIRCUIT INSPECTION
SHOWN IN PROBLEM SYMPTOMS TABLE**

NG

2 INSPECT FUSE (ECU-IG1)

- (a) Remove the ECU-IG1 fuse from the instrument panel junction block.

- (b) Measure the resistance of the fuse.

Standard resistance:

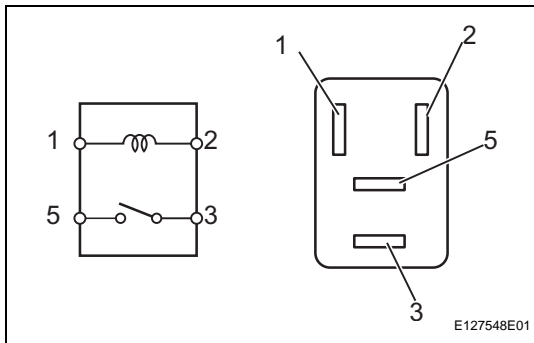
Below 1 Ω

NG

REPLACE FUSE

OK

3 INSPECT MAGNETIC CLUTCH RELAY (Marking: MG CLT)



- (a) Remove the magnetic clutch relay from the engine room No. 1 relay block.

- (b) Measure the resistance of the relay.

Standard resistance

Tester Connection	Specified Condition
3 - 5	10 k Ω or higher
3 - 5	Below 1 Ω (when battery voltage is applied to terminals 1 and 2)

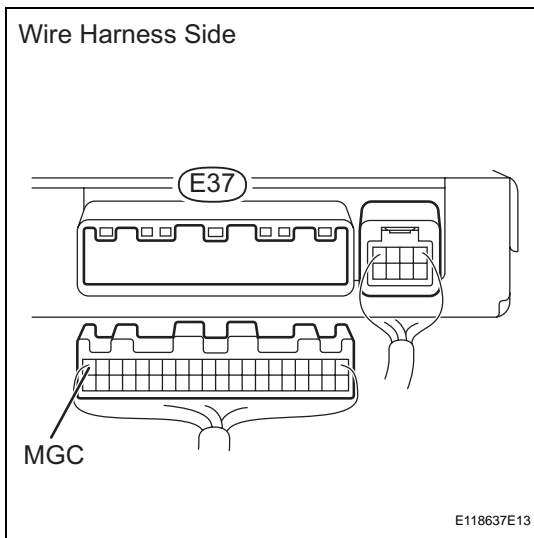
NG

REPLACE MAGNETIC CLUTCH RELAY

OK

AC

4 CHECK WIRE HARNESS (AIR CONDITIONING AMPLIFIER - BATTERY)



- (a) Disconnect the E37 amplifier connector.

- (b) Measure the voltage of the wire harness side connector.

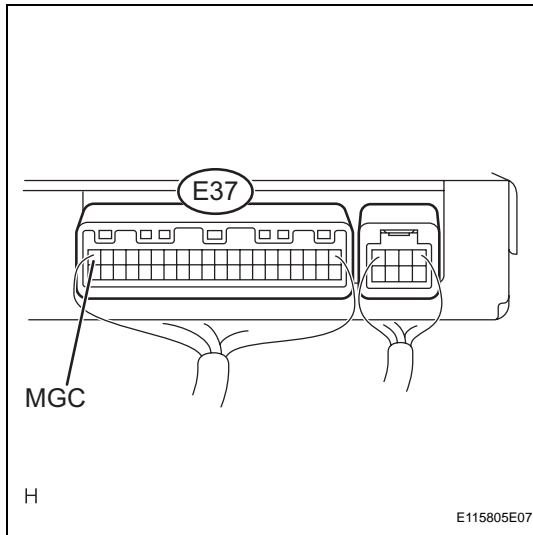
Standard voltage

Tester Connection	Condition	Specified Condition
E37-20 (MGC) - Body ground	Ignition switch ON	10 to 14 V
E37-20 (MGC) - Body ground	Ignition switch OFF	Below 1 V

NG

REPAIR OR REPLACE HARNESS AND CONNECTOR

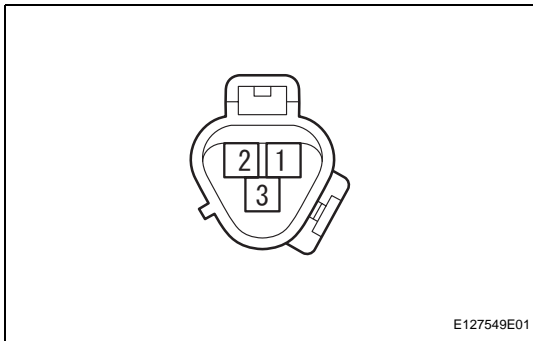
OK

5 CHECK AIR CONDITIONING AMPLIFIER (MGC VOLTAGE)

- (a) Remove the air conditioning amplifier with its connectors still connected.
- (b) Measure the voltage of the connector.

Standard voltage

Tester Connection	Condition	Specified Condition
E37-20 (MGC) - Body ground	Ignition switch ON A/C switch OFF	10 to 14 V
E37-20 (MGC) - Body ground	Ignition switch ON A/C switch ON	Below 1.5 V

NG**REPLACE AIR CONDITIONING AMPLIFIER****OK****6 CHECK MAGNETIC CLUTCH**

- (a) Disconnect the B47 magnetic clutch connector.
- (b) Connect the battery's positive (+) lead to terminal 3 of the magnetic clutch and the negative (-) lead to the body ground.

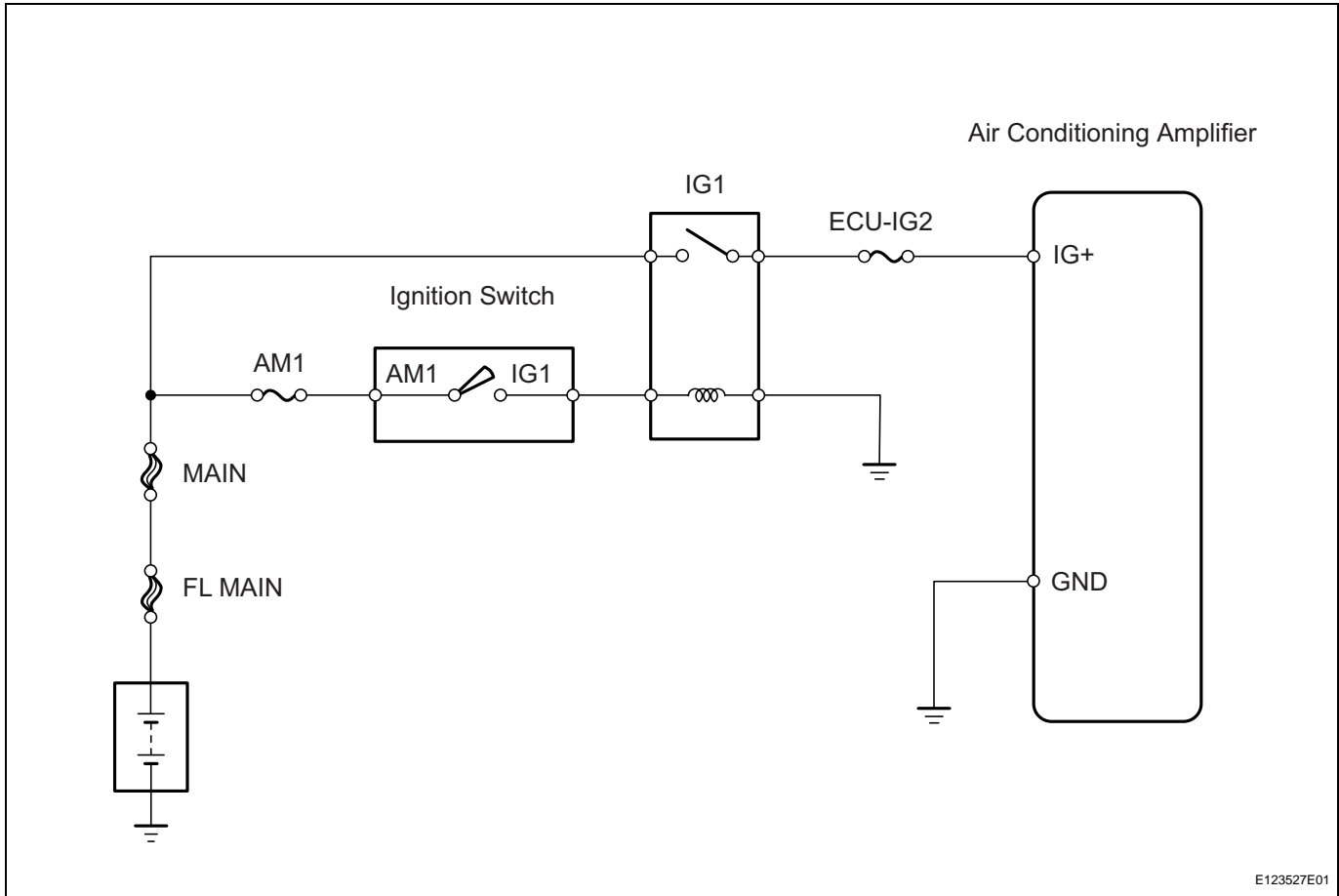
OK:**Magnetic clutch is engaged.****NG****REPLACE MAGNETIC CLUTCH****OK****AC****REPAIR OR REPLACE WIRE HARNESS (MAGNETIC CLUTCH - ECU-IG1)**

IG Power Source Circuit

DESCRIPTION

This is the main power source supplied to the air conditioning amplifier when the ignition switch is ON (IG). This power source is used for operating components, such as the air conditioning amplifier and servo motors.

WIRING DIAGRAM



INSPECTION PROCEDURE

1 INSPECT FUSE (ECU-IG2)

- Remove the ECU-IG2 fuse from the instrument panel junction block.
- Measure the resistance of the fuse.

Standard resistance:

Below 1 Ω

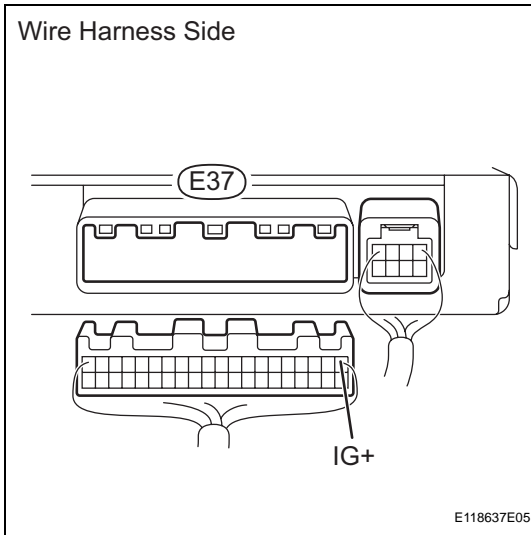
NG

REPLACE FUSE

OK

2 CHECK WIRE HARNESS (AIR CONDITIONING AMPLIFIER - BATTERY)

Wire Harness Side



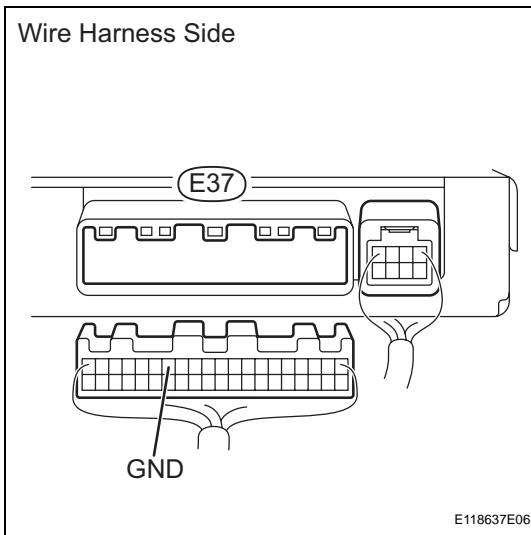
- (a) Disconnect the E37 amplifier connector.
(b) Measure the voltage of the wire harness side connector.

Standard voltage

Tester Connection	Condition	Specified Condition
E37-1 (IG+) - Body ground	Ignition switch ON	10 to 14 V

NG**REPAIR OR REPLACE HARNESS AND CONNECTOR****OK****3 CHECK WIRE HARNESS (AIR CONDITIONING AMPLIFIER - BODY GROUND)**

Wire Harness Side



- (a) Disconnect the E37 amplifier connector.
(b) Measure the resistance of the wire harness side connector.

Standard resistance

Tester Connection	Specified Condition
E37-14 (GND) - Body ground	Below 1 Ω

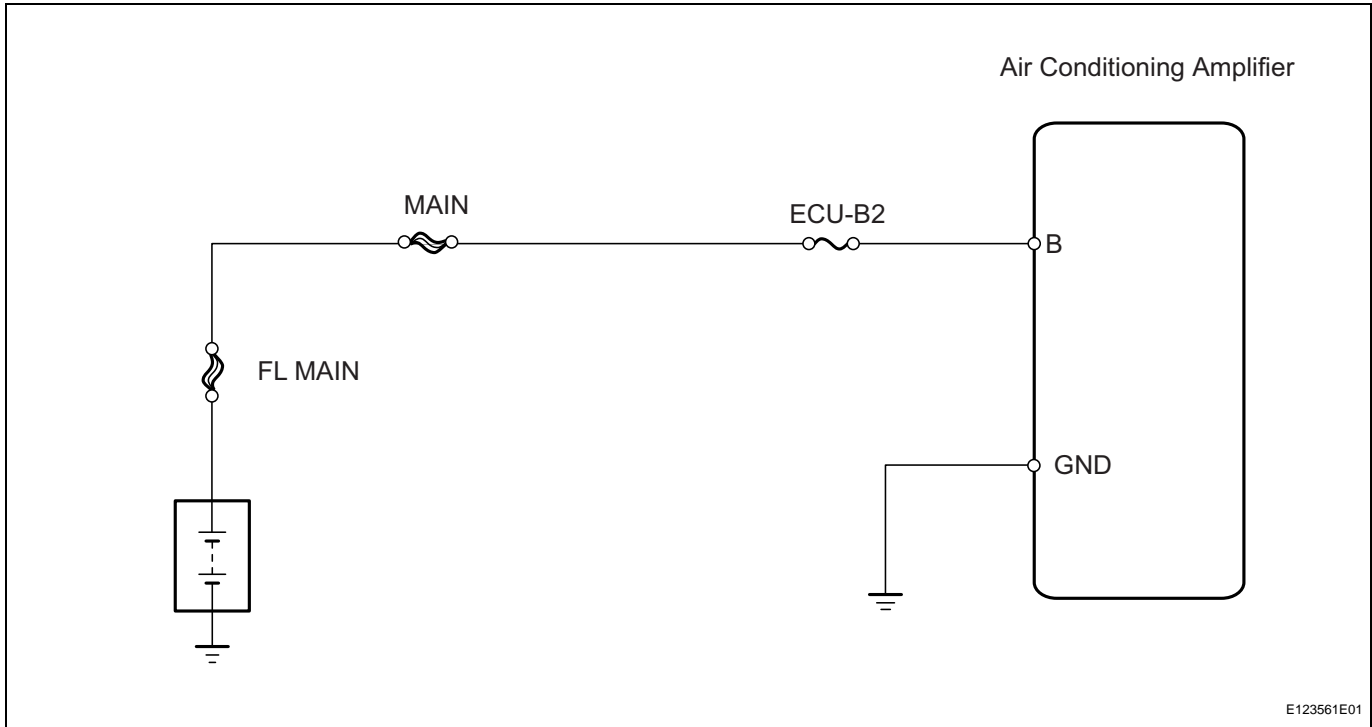
NG**REPAIR OR REPLACE HARNESS AND CONNECTOR****OK****AC****PROCEED TO NEXT CIRCUIT INSPECTION SHOWN IN PROBLEM SYMPTOMS TABLE**

Back-up Power Source Circuit

DESCRIPTION

This is the back-up power source circuit for the air conditioning amplifier. Power is supplied even when the ignition switch is turned OFF and is used for functions such as the diagnostic trouble code memory.

WIRING DIAGRAM



AC

INSPECTION PROCEDURE

1

INSPECT FUSE (ECU-B2)

- Remove the ECU-B2 fuse from the engine room No. 2 relay block.
- Measure the resistance of the fuse.

Standard resistance:

Below 1 Ω

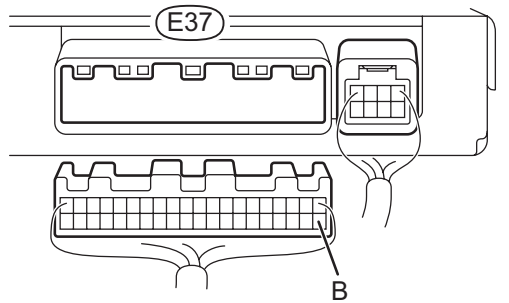
NG

REPLACE FUSE

OK

2 CHECK WIRE HARNESS (AIR CONDITIONING AMPLIFIER - BATTERY)

Wire Harness Side



E118637E07

- Disconnect the E37 amplifier connector.
- Measure the voltage of the wire harness side connector.

Standard voltage

Tester Connection	Specified Condition
E37-21 (B) - Body ground	10 to 14 V

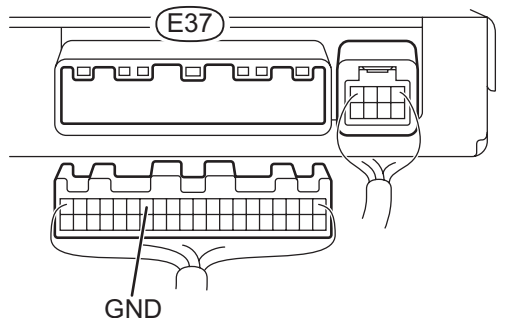
NG

REPAIR OR REPLACE HARNESS AND CONNECTOR

OK

3 CHECK WIRE HARNESS (AIR CONDITIONING AMPLIFIER - BODY GROUND)

Wire Harness Side



E118637E08

- Disconnect the E37 amplifier connector.
- Measure the resistance of the wire harness side connector.

Standard resistance

Tester Connection	Specified Condition
E37-14 (GND) - Body ground	Below 1 Ω

NG

REPAIR OR REPLACE HARNESS AND CONNECTOR

OK

AC

PROCEED TO NEXT CIRCUIT INSPECTION SHOWN IN PROBLEM SYMPTOMS TABLE